

FORT LEWIS COLLEGE
DURANGO, COLORADO

7.8-10082

NASA CR:

151643

FINAL REPORT, PHASE I
Contract NAS9-15276
Volume II: Appendices

"Development of a Winter Wheat Adjustable
Crop Calendar Model"

(E78-10089) DEVELOPMENT OF A WINTER WHEAT
ADJUSTABLE CROP CALENDAR MODEL. VOLUME 2:
APPENDICES Final Report (Fort Lewis A&M
Coll.) 79 p HC A05/MF A01 CSCL 02C

N78-19568

G3/43 00089
Unclas

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Submitted to:

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February 14, 1978



APPENDIX A

Data Reduction Program

The program uses meteorological data in English units as input. These values are converted to SI units and averaged spatially and temporally. These values, and associated statistics, are output.

**WRITE PRINT,DATAREDY

DATA SET DATAREDY AT LEVEL 022 AS OF 10/05/77

PROGRAM NAME
DATAREDYPURPOSE
TO CONVERT DATA INPUT FROM CARDS TO CORRELATE WITH
LEAST SQUARES REGRESSION PROGRAM

METHOD

READ IN NUMBER OF STATIONS TO BE EVALUATED AS WELL AS
THE NUMBER OF DAYS. THE NEXT INFORMATION TO BE READ
IN ARE THE STATION NAMES, THEIR LATITUDES, LONGITUDES,
AND ELEVATIONS. THE MEANS AND STANDARD DEVIATIONS
OF THESE INPUT ITEMS ARE CALCULATED.
THE NEXT ITEMS TO BE READ IN ARE...JULIAN DAY
MAXIMUM AND MINIMUM TEMPERATURES FOR EACH
STATION

PRECIPITATION FOR EACH STATION

THE MEANS AND STANDARD DEVIATIONS OF THESE PARAMETERS
ARE COMPUTED. THE FINAL PORTION OF THE PROGRAM GENERATES
THE POOLED AVERAGE AND STANDARD DEVIATION OF THE PARAMETERS.
THE JULIAN DAYS AND POOLED COMPUTATIONS ARE THEN USED TO CREATE A
NEW DATA FILE FOR INPUT TO THE LEAST SQUARES PROGRAM.DIMENSION NAMSTA(10,10), ELAT(10), ELON(10), ELEV(10),
LJON(50),TMAX(5,50),TMIN(5,50),PRECIP(5,50),TX(50),TM(50),PR(50),
2TX(500),TMM(500),PRR(500),DAYLTH(50)

IN = 1

IP = 2

ICUT = 3

READ(IN,82) NPAGE,NDAILY

82 FORMAT(2I5)

DO 444 IPAGE=1,NPAGE

READ(IN,1) NSTA,NDAY,IDIST,IYEAR

1 FORMAT(2I10,6X,A4,6X,I4)

WRITE(ICUT,2)

2 FORMAT(1I1)

WRITE(ICUT,11)NSTA,NDAY,IDIST,IYEAR

11 FORMAT(1H,*,NO. OF STATIONS=*,15,*, NO. OF DAYS=*,15,5X,

C *REGION=*,A4,5X *CROP YEAR=*,14)

DO 4 ISTA = 1, NSTA

READ(IN,3) (NAMSTA(ISTA,J),J=1,5), ELAT(ISTA),

1ELON(ISTA), ELEV(ISTA)

3 FORMAT(5A4,3F16.5)

CONVERT ELEVATION FROM ENGLISH TO METRIC MEASURE

ELEV(ISTA)=ELEV(ISTA)*.3048

00001

00002

00003

00004

00005

00006

00007

00008

00009

00010

00011

00012

00013

00014

00015

00016

00017

00018

00019

00020

00021

00022

00023

00024

00025

00026

00027

00028

00029**8

00030**9

00031

00032*17

00033

00034*20

00035*21

00036*13

00037*14

00038*18

00039*17

00040*17

00041*18

00042*18

00043*17

00044

00045

00046

00047

00048

00049

00050

00051

```

4 CONTINUE
  ELATBR = AMEAN(ELAT, NSTA)
  ELONBR = AMEAN(ELON, NSTA)
  ELEVBR = AMEAN(ELEV, NSTA)
  CALL STDEV(ELAT, ELATBR, NSTA, SIGLAT)
  CALL STDEV(ELON, ELONBR, NSTA, SIGLON)
  CALL STDEV(ELEV, ELEVBR, NSTA, SIGELE)
  WRITE(IP, 84) IDIST, YEAR, ELATBR, ELONBR, ELEVBR, SIGLAT, SIGLON, SIGELE
84 FORMAT(1X, A4, 1X, I4, 10X, 6F10.3)
  GO TO 113, 113, 113, 114, 151, NSTA
13 WRITE(IOUT, 5) ((NAMSTAT(ISTA, J), J=1, 5), ISTA=1, NSTA)
5 FORMAT(1H, 'STATION', 3(5A4), 5X, 'AVERAGE', 5X, 'STDEV', ')
  WRITE(IOUT, 6) (ELAT(ISTA), ISTA=1, NSTA), ELATBR, SIGLAT
6 FORMAT(1H, 'LATITUDE', 3(F18.3, 2X), 3X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 7) (ELON(ISTA), ISTA=1, NSTA), ELONBR, SIGLON
7 FORMAT(1H, 'LONGITUDE', 3(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 8) (ELEV(ISTA), ISTA=1, NSTA), ELEVBR, SIGELE
8 FORMAT(1H, 'ELEVATION', 3(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 10)
10 FORMAT(1H, 'JDN', 5X, 3(2X, 'TX', 4X, 'TM', 4X, 'PR', 5X), ' DL')
  GO TO 30
14 WRITE(IOUT, 16) ((NAMSTAT(ISTA, J), J=1, 5), ISTA=1, NSTA)
16 FORMAT(1H, 'STATION', 4(5A4), 5X, 'AVERAGE', 5X, 'STDEV', ')
  WRITE(IOUT, 17) (ELAT(ISTA), ISTA=1, NSTA), ELATBR, SIGLAT
17 FORMAT(1H, 'LATITUDE', 4(F18.3, 2X), 3X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 18) (ELON(ISTA), ISTA=1, NSTA), ELONBR, SIGLON
18 FORMAT(1H, 'LONGITUDE', 4(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 19) (ELEV(ISTA), ISTA=1, NSTA), ELEVBR, SIGELE
19 FORMAT(1H, 'ELEVATION', 4(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 20)
20 FORMAT(1H, 'JDN', 5X, 4(2X, 'TX', 4X, 'TM', 4X, 'PR', 5X), ' DL')
  GO TO 30
15 WRITE(IOUT, 25) ((NAMSTAT(ISTA, J), J=1, 5), ISTA=1, NSTA)
25 FORMAT(1H, 'STATION', 5(5A4), 5X, 'AVERAGE', 5X, 'STDEV', ')
  WRITE(IOUT, 26) (ELAT(ISTA), ISTA=1, NSTA), ELATBR, SIGLAT
26 FORMAT(1H, 'LATITUDE', 5(F18.3, 2X), 3X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 27) (ELON(ISTA), ISTA=1, NSTA), ELONBR, SIGLON
27 FORMAT(1H, 'LONGITUDE', 5(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 28) (ELEV(ISTA), ISTA=1, NSTA), ELEVBR, SIGELE
28 FORMAT(1H, 'ELEVATION', 5(F17.3, 3X), 2X, F9.3, 3X, F7.2, 2X)
  WRITE(IOUT, 29)
29 FORMAT(1H, 'JDN', 5X, 5(2X, 'TX', 4X, 'TM', 4X, 'PR', 5X), ' DL')
30 CONTINUE
  ISTDAY = 0
  DO 35 IDAY = 1, NDAY
    READ(IN, 40) JDN(IDAY), (TMAX(ISTA, IDAY),
  ITMIN(ISTA, IDAY), PRECIP(ISTA, IDAY), ISTA=1, NSTA)
40 FORMAT(15, 5(2F5.0, F5.2))
    DAYLTH(IDAY) = 12.14 + (3.37 * SIN(ELATBR/57.29577951)) / COS(ELATBR/
  X 57.29577951) * COS(.0172 * JDN(IDAY) - 2.94)
    DO 45 ISTA = 1, NSTA
      TX(ISTA) = TMAX(ISTA, IDAY)
      TM(ISTA) = ITMIN(ISTA, IDAY)

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OF POOR QUALITY

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PR(ISTA) = PRECIP(ISTA, IDAY) 00105
C C CONVERT TEMPERATURES AND PRECIPITATION FROM ENGLISH TO METRIC . 00106
C TX(ISTA) = .555*(TX(ISTA) - 32.) 00107
C TM(ISTA) = .555*(TM(ISTA) - 32.) 00108
C PR(ISTA) = 25.4*PR(ISTA) 00109
C ISTDAY = ISTDAY + 1 00110
C TXX(ISTDAY) = TX(ISTA) 00111
C TMM(ISTDAY) = TM(ISTA) 00112
C PRR(ISTDAY) = PR(ISTA) 00113
45 CONTINUE 00114
C TXBAR = AMEAN(TX, NSTA) 00115
C TMBAR = AMEAN(TM, NSTA) 00116
C PRBAR = AMEAN(PR, NSTA) 00117
C CALL STDEV(TX, TXBAR, NSTA, SIGTX) 00118
C CALL STDEV(TM, TMBAR, NSTA, SIGTM) 00119
C CALL STDEV(PR, PRBAR, NSTA, SIGPR) 00120
C IF (NDAILY .EQ. 0) GO TO 56 00121
C WRITE(IP, 333) JDN(IDAY), TXBAR, TMBAR, PRBAR, SIGTX, SIGTM, SIGPR 00122
333 FORMAT(10, 6F10.2, 110) 00123*19
56 GO TO (51, 53, 53, 54, 55), NSTA 00124*19
53 WRITE (IOUT, 60) JDN(IDAY), (TMAX(ISTA, IDAY), TMIN(ISTA, IDAY), 00125*19
1PRECIP(ISTA, IDAY), ISTA=1, NSTA), DAYLTH(IDAY), TXBAR, TMBAR, PRBAR, 00126*20
2SIGTX, SIGTM, SIGPR 00127
60 FORMAT(1H, 13, 5X, 3(F5.1, 1X, F5.1, 1X, F5.2, 4X), F5.1/1H, 4X, 'AVG', 00128**2
X 3F6.2, 19X, 'STDEV', 3F6.1) 00129
GO TO 35 00130*11
54 WRITE (IOUT, 65) JDN(IDAY), (TMAX(ISTA, IDAY), TMIN(ISTA, IDAY), 00131*11
1PRECIP(ISTA, IDAY), ISTA=1, NSTA), DAYLTH(IDAY), TXBAR, TMBAR, PRBAR, 00132
2SIGTX, SIGTM, SIGPR 00133
65 FORMAT(1H, 13, 5X, 4(F5.1, 1X, F5.1, 1X, F5.2, 4X), F5.1/1H, 4X, 'AVG', 00134**2
X 3F6.2, 19X, 'STDEV', 3F6.1) 00135
GO TO 35 00136*11
55 WRITE (IOUT, 70) JDN(IDAY), (TMAX(ISTA, IDAY), TMIN(ISTA, IDAY), 00137*11
1PRECIP(ISTA, IDAY), ISTA=1, NSTA), DAYLTH(IDAY), TXBAR, TMBAR, PRBAR, 00138
2SIGTX, SIGTM, SIGPR 00139
70 FORMAT(1H, 13, 5X, 5(F5.1, 1X, F5.1, 1X, F5.2, 4X), F5.1/1H, 4X, 'AVG', 00140**2
X 3F6.2, 19X, 'STDEV', 3F6.1) 00141
35 CONTINUE 00142*11
DAYLBR = AMEAN(DAYLTH, NDAY) 00143*11
SDAYL = ABS(3.370*(1./COS(FLATBR/57.29577951)))**2*COS(.0172 00144
X *DAYLBR - 2.94))**SIGLAT/57.29577951 00145**5
TXXPR = AMEAN(TXX, ISTDAY) 00146**5
TMMPR = AMEAN(TMM, ISTDAY) 00147**5
PRRPR = AMEAN(PRR, ISTDAY) 00148
CALL STDEV(TXX, TXXBAR, ISTDAY, SIGTXX) 00149
CALL STDEV(TMM, TMMPR, ISTDAY, SIGTMM) 00150
CALL STDEV(PRR, PRRBAR, ISTDAY, SIGPRR) 00151
WRITE(IOUT, 81) TXXBAR, TMMPR, PRRBAR, SIGTXX, SIGTMM, SIGPRR, DAYLBR, 00152
CSDAYL 00153
81 FORMAT(1H0, 'POOLED', 3F6.2, 15X, 'POOLED', 3F6.2, 5X, 'DAYLENGTH AVG', 00154**7
X F9.2/ 'AVG', 37X, 'STDEV', 25X, 'DAYLENGTH STDEV', F7.2) 00155**4
00156*11
00157**2
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      WRITE(IP,83)TXXBAR,TMMBAR,PRRBAR,SIGTXX,SIGTMM,SIGPRR      00158*17
83  FORMAT(10X,6F10.2)      00159*14
444 CONTINUE      00160*13
      END      00161
      FUNCTION AMEAN (X, N)      00162
      DIMENSION X(1)      00163*11
      SUM = 0.      00164
      DO 160 I=1, N      00165
      SUM = SUM + X(I)      00166
160 CONTINUE      00167
      AMEAN = SUM / FLOAT(N)      00168
      RETURN      00169
      END      00170
      SUBROUTINE STDEV (Y, YBAR, N, SIGY)      00171
      DIMENSION Y(1)      00172*11
      VSQR = 0.      00173
      DO 170 J = 1, N      00174
      V = Y(J) - YBAR      00175
      VSQR = VSQR + V**2      00176
170 CONTINUE      00177
      SIGY = SQRT(VSQR/(FLOAT(N) - 1.0))      00178
      RETURN      00179
      END      00180
***** ABOVE ACTION SATISFACTORILY COMPLETED *****
```


NO. OF STATIONS= 5				NO. OF DAYS= 31				REGION= MTAL				CROP YEAR= 1971				WEST MONT. DR.				AVERAGE	STDEV
STATION1-2 DEER LODGE 3W				HUNGRY HORSE DAM				LIBBY INE RS				ST. IGNATIUS									
LATITUDE 46.383				48.350				48.400				47.317				46.333				47.357	1.0
LONGITUDE 112.817				114.000				115.533				114.100				114.067				114.103	0.9
ELEVATION 265.176				48.768				24.384				274.320				181.966				158.923	117.6
JUN	TX	TM	PR	TX	TM	PR	TX	TM	PR	TX	TM	PR	TX	TM	PR	TX	TM	PR	DL		
1	23.0	5.0	0.0	34.0	15.0	0.0	34.0	5.0	0.0	33.0	15.0	0.02	31.0	12.0	0.0				8.6		
2	AVG 0.0	-11.99	0.10				STDEV 1.4	2.8	0.2				25.0	6.0	0.0	24.0	0.0	0.0	8.6		
3	AVG -5.11	-17.98	0.20				STDEV 1.9	2.9	0.5				21.0	9.0	0.05	21.0	3.0	0.0	8.6		
4	AVG -8.79	-13.43	0.25				STDEV 2.8	4.2	0.6				15.0	0.0	0.02	11.0	-8.0	0.0	8.6		
5	AVG -11.65	-22.75	0.30				STDEV 1.4	3.6	0.5				13.0	-3.0	0.04	8.0	-9.0	0.04	8.6		
6	AVG -13.10	-23.53	0.66				STDEV 2.0	3.8	0.4				13.0	-3.0	0.01	14.0	-1.0	0.0	8.6		
7	AVG -10.66	-17.31	0.10				STDEV 0.9	1.0	0.1				19.0	11.0	0.18	20.0	10.0	0.04	8.7		
8	AVG -5.99	-12.76	0.74				STDEV 1.4	0.9	1.3				39.0	16.0	0.02	43.0	18.0	0.02	8.7		
9	AVG 0.49	-3.55	1.12				STDEV 5.0	2.6	1.3				40.0	32.0	0.32	42.0	33.0	0.10	8.7		
10	AVG 2.66	-3.77	3.15				STDEV 2.6	4.6	2.8				41.0	16.0	0.0	41.0	30.0	0.14	8.7		
11	AVG 0.89	-7.55	3.86				STDEV 6.0	6.1	4.3				18.0	8.0	0.22	37.0	24.0	0.0	8.8		
12	AVG -5.77	-14.54	3.30				STDEV 7.4	6.6	3.0				12.0	-6.0	0.13	29.0	11.0	0.09	8.8		
13	AVG -11.10	-19.54	2.54				STDEV 6.5	5.4	1.7				11.0	-5.0	0.03	24.0	-3.0	0.0	8.8		
14	AVG -10.10	-21.64	1.02				STDEV 4.5	2.3	0.7				30.0	-5.0	0.0	29.0	6.0	0.0	8.8		
15	AVG -5.22	-18.65	1.57				STDEV 5.2	2.5	2.2				44.0	10.0	0.0	41.0	20.0	0.02	8.9		
16	AVG 2.11	-10.77	7.06				STDEV 4.4	3.5	9.9				45.0	38.0	0.03	45.0	35.0	0.01	8.9		
17	AVG 4.64	-3.13	6.53				STDEV 1.7	3.4	7.4				49.0	32.0	0.11	50.0	32.0	0.28	8.9	80	
18	AVG 7.55	0.22	5.84				STDEV 2.3	0.8	4.2				44.0	32.0	0.0	44.0	33.0	0.0	8.9		
19	AVG 6.22	-0.67	0.0				STDEV 1.3	1.2	0.0				52.0	37.0	0.03	61.0	31.0	0.0	9.0		
20	AVG 10.21	-0.44	4.42				STDEV 5.3	2.4	5.7				49.0	28.0	0.02	54.0	27.0	0.19	9.0		
21	AVG 7.65	-2.66	3.66				STDEV 3.0	1.6	4.9				32.0	14.0	0.05	31.0	23.0	0.02	9.0		
22	AVG 0.22	-5.33	0.76				STDEV 1.6	3.2	0.5				33.0	12.0	0.0	34.0	19.0	0.0	9.1		
23	AVG 0.22	-9.43	0.20				STDEV 1.3	3.6	0.3				42.0	30.0	0.0	45.0	30.0	0.0	9.1		
24	AVG 5.11	-1.06	0.41				STDEV 1.8	2.1	0.9				42.0	26.0	0.0	40.0	30.0	0.0	9.1		
25	AVG 4.13	-1.13	0.91				STDEV 0.8	1.5	1.4				41.0	32.0	0.05	44.0	33.0	0.0	9.2		
26	AVG 4.99	-0.22	0.76				STDEV 1.2	0.6	0.7				46.0	32.0	0.11	50.0	37.0	0.0	9.2		
27	AVG 5.66	-0.55	3.61				STDEV 3.2	2.1	4.7				54.0	31.0	0.0	55.0	29.0	0.0	9.3		
28	AVG 7.97	-1.00	0.41				STDEV 4.3	1.3	0.9				53.0	31.0	0.0	57.0	29.0	0.0	9.3		
29	AVG 6.66	-2.00	0.0				STDEV 4.0	1.6	0.0				54.0	33.0	0.0	55.0	33.0	0.0	9.3		
30	AVG 10.23	-0.22	0.13				STDEV 1.6	0.7	0.2				57.0	40.0	0.0	56.0	44.0	0.0	9.4		
31	AVG 12.21	3.55	5.99				STDEV 1.5	2.6	10.5				57.0	47.0	0.0	57.0	48.0	0.01	9.4		
	AVG 11.77	5.11	0.25				STDEV 2.5	3.3	0.4												
POOLED 0.95 -8.10 2.00				POOLED 8.32 8.99 3.91				DAYLENGTH AVG 8.93				DAYLENGTH STDEV 0.12									

APPENDIX B

Variation of Parameters Program

The program estimates function parameters using the least squares method of variation of parameters. Functional forms may be varied by changing the FORTRAN expression in the EF FUNCTION subprogram. The typical output shown is for an exponential function using linear and interaction terms of T_x , T_m , and D_L for stage 2-3 (joint-head).

DATA SET EXPI

AT LEVEL TMP AS OF 08/19/77

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LEAST SQUARES REGRESSION FOR WINTER WHEAT CROP CALENDAR MODEL

THE PROGRAM ESTIMATES PARAMETERS OF A FUNCTION USING THE LEAST SQUARE METHOD OF VARIATION OF PARAMETERS, A SPECIAL CASE OF THE METHOD OF SIMULTANEOUS ADJUSTMENT OF OBSERVATIONS AND PARAMETERS. THE DEPENDENT VARIABLE IS DAILY GROWTH RATE WITHIN EACH PHENOLOGICAL STAGE FOR WINTER WHEAT. THE INDEPENDENT VARIABLES ARE DAILY OR AVERAGE VALUES OF MAXIMUM TEMPERATURE, MINIMUM TEMPERATURE, DAY LENGTH, AND PRECIPITATION.

THE PROGRAM HAS THE CAPABILITY THAT ANY FORM OF FUNCTION MAY BE ASSUMED. TO CHANGE FUNCTION FORM, SIMPLY CHANGE THE FUNCTION GIVEN IN THE OF SUBPROGRAM WHICH FOLLOWS THE MAIN, AND CHANGE THE FIRST THREE DATA CARDS.

DIMENSION, DATA, EQUIVALENCE, TYPE BLOCK

IMPLICIT REAL*8(A-H,C-Z)

DOUBLE PRECISION EN(20,20),X

DIMENSION X(20),J2(20),J2(20),ISTAGE(5),H(20),G(7),DF(20),CS(7)

DIMENSION DAY(250),TMAX(250),TMIN(250),DAYLEN(250)

DIMENSION PRECIP(250),B(20),T(20),DELF(20)

DIMENSION STMAX(250),STMIN(250),SEPC(250)

DIMENSION R(250),SCAYL(250),S(20),IEGNAM(80)

EQUIVALENCE (G(6),ELAT),(G(7),ELEV)

EQUIVALENCE (G(1),RATE),(G(2),T4),(G(3),TM),(G(4),CL),(G(5),PR)

DATA PH/20*,00017

COMMON S

THE FIRST THREE (THERE MUST BE EXACTLY THREE) DATA CARDS ARE THE FORTRAN EXPRESSION FOR THE FUNCTION SELECTED, READ IN 2 FORMAT.

READ(1,94)(IFONAM(I),I=1,60)
99 FORMAT(20A4)

BEGIN LOOP FOR REGRESSION

(SEPARATE REGRESSION FOR EACH PHENOLOGICAL STAGE)

DO 2222 ISTAGE=1,5

DO 7 I=1,500

7 R(I)=0.

FOR EACH STAGE INTERVAL, A STAGE "HEADER" CARD IS READ WITH THE FOLLOWING

IBSTG = STAGE NUMBER AT BEGINNING OF INTERVAL

NDSTG = STAGE NUMBER AT END OF INTERVAL

WHERE

0 = PLANTING

1 = EMERGENCE

2 = JOINTING

3 = HEADING

4 = SOFT DOUGH

```

      5 = RIPE
      THESE ARE ENTERED AS INTEGERS, RIGHT ADJUSTED IN THE FIRST TWO
      FIVE COLUMN FIELDS
      ISTGNM = ALPHANUMERIC NAME OF THE INTERVAL, CORRESPONDING TO THE STAGE
      NUMBERS ABOVE (EXAMPLE... JOINTING-HEADING). ENTERED IN ALPHANUMERIC
      IN COLUMNS 16-35.
      LOCYRS = NUMBER OF LOCATION YEARS OF DATA TO FOLLOW, ENTERED AS AN
      INTEGER RIGHT ADJUSTED IN COLUMNS 36-40.
      NVARBL = NUMBER OF INDEPENDENT VARIABLES CHOSEN (POSSIBILITIES ARE
      TMAX, TMIN, DAYLTH, PRECIP, LATITUDE, ELEVATION), IN COL 41-45
      NOBS = NUMBER OF OBSERVED QUANTITIES FOR EACH EQUATION (WILL
      ORDINARILY BE 1, MEANING ONE RATE IS ASSUMED OBSERVED FOR EACH
      DATA POINT), IN COL 46-50
      NPAR = NUMBER OF PARAMETERS SELECTED FOR THE FIT, IN COL 51-55

0017      READ(1,100) IBGSTG,NDSTGE,(ISTGNM(I),I=1,5),LOCYRS,NVARBL,NOBS,
      1 NPAR
0018      100 FORMAT(2I5,5X,5A4,4I5)
0019      WRITE(3,101) IBGSTG,NDSTGE,(ISTGNM(I),I=1,5)
0020      101 FORMAT(1H1,77,5X,'REGRESSION FOR WINTER WHEAT FROM STAGE',I2,' TO
      1 STAGE',I2,'',5A4,77)
0021      WRITE(3,102) LOCYRS
0022      102 FORMAT(5X,'NUMBER OF LOCATION-YEARS =',I5,77)
0023      WRITE(3,103) NVARBL,NOBS
0024      103 FORMAT(5X,'NUMBER OF VARIABLES CHOSEN (TMAX,TMIN,DAYLTH,PRECIP,LAT
      1ITUDE,ELEV) =',I5,7,5X,'NUMBER OF OBSERVED QUANTITIES PER EQUATION
      2 =',I5)
0025      WRITE(3,126) NPAR
0026      126 FORMAT(5X,'NUMBER OF H PARAMETERS =',I5)
0027      WRITE(3,98)
0028      98 FORMAT(5X,'FOR EQUATION OF THE FORM',77)
0029      WRITE(3,97)((EQNAM(I),I=1,60)
0030      97 FORMAT(5X,20A4)

      INITIALIZE PARAMETERS

0031      DO 10 I=1,20
0032      10 H(I)=0.0
0033      READ(1,349)((H(I),I=1,NPAR)
0034      349 FORMAT(8F10.0)
      READ IN DATA SET AND SET UP VARIABLE INDEX

0035      IPT=0
0036      DO 1111 LOCYR=1,LOCYRS

      FOR EACH LOCATION YEAR OF DATA USED, A 'HEADER' IS READ WITH THE FOLLOWING
      LOCIDN = LOCATION IDENTIFICATION, IN ALPHANUMERIC IN COL 2-5,
      CONSISTING OF A 3 LETTER CODE FOR THE STATE, FOLLOWED BY THE CROP NUMBER
      (EXAMPLE... CLO7 = COLORADO, CRD 7)
      IYEAR = THE CROP YEAR, COL 6-10
      IDAYRG = JULIAN DAY NUMBER AT WHICH THIS PHENOLOGICAL INTERVAL

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C      BEGAN FOR THAT LOCATION YEAR, CCL 11-15                                C0116
C      IDAYND = JULIAN DAY NUMBER AT WHICH THIS PHENOLOGICAL INTERVAL          C0117
C      ENDED FOR THIS LOCATION YEAR, CCL 16-20                                C0118**5
C      ELAT = LATITUDE OF THE CRD, EITHER THE LATITUDE OF A MET STATION        C0119
C      NEAR THE CENTER, OR THE AVERAGE OF SEVERAL THROUGHOUT THE CRD,        C0120
C      COL 21-30                                                                C0121**5
C      ELONG = LONGITUDE OF THE CRD, CCL 31-40                                C0122
C      ELEV = ELEVATION OF THE CRD, COL 41-50                                C0123
C      SLAT = STANDARD DEVIATION OF THE LATITUDE, COL 51-60                    C0124
C      SLONG = STANDARD DEVIATION OF THE LONGITUDE, COL 61-70                  C0125**5
C      SELEV = STANDARD DEVIATION OF THE ELEVATION, CCL 71-80                  C0126
C                                                                              C0127**5
0037  READ(1,104) LOCION,IYEAR,IDAYBG,IDAYND,ELAT,ELONG,ELEV,SLAT,SLONG,      C0128
      ISELEV                                                                    C0129**5
0038  105 FORMAT(1X,A4,3I5,6F10.0)                                           C0130
0039  IF (ISTAGE.EQ.2) READ(1,348) IDRMCY,IGRNUP                               C0131**5
0040  348 FORMAT(2I10)                                                         C0132
0041  WRITE(3,105) LOCION,IYEAR                                                C0133**5
0042  105 FORMAT(777,10X,'REGION =',A4,10X,'CROP YEAR =',I5)                 C0134
0043  WRITE(3,106) IDAYBG,IDAYND                                              C0135**5
0044  106 FORMAT(10X,'STAGE RUNS FROM DAY',I5,' TO DAY',I5)                  C0136
0045  WRITE(3,107) ELAT,SLAT                                                  C0137**5
0046  107 FORMAT(10X,'LATITUDE =',F10.3,10X,'STD DEV =',F10.3)               C0138
0047  WRITE(3,108) ELONG,SLONG                                                C0139**5
0048  108 FORMAT(10X,'LONGITUDE =',F10.3,10X,'STD DEV =',F10.3)              C0140**5
0049  WRITE(3,109) ELEV,SELEV                                                 C0141**5
0050  109 FORMAT(10X,'ELEVATION =',F10.3,10X,'STD DEV =',F10.3)              C0142**5
0051  WRITE(3,110)                                                            C0143**5
0052  110 FORMAT(77,7X,'DAY',6X,'TMAX',3X,'STD DEV',6X,'TMIN',3X,'STD DEV',4  C0144**5
      1X,'DAYLEN',3X,'STD DEV',77)                                           C0145**5
0053  DO 11 JDAY=1,300                                                         C0146**5
0054  IPT=IPT+1                                                                C0147**5
C      FOR EACH LOCATION YEAR, FROM ONE TO 1000 DATA POINTS MAY BE ENTERED  C0148
C      CONTAINING METEOROLOGICAL DATA. USUALLY, AVERAGE MET VALUES WILL BE  C0149
C      USED, SO THERE WILL ONLY BE ONE CARD. HOWEVER, THE PROGRAM CAN ACC     C0150
C      DAILY VALUES AS WELL. FOR THE EMERGE-JOINT INTERVAL, MONTHLY AVERAG  C0151
C      MET DATA CAN BE USED.                                                 C0152
C                                                                              C0153
C      IPT = POINT NUMBER, THE INDEX USED.                                    C0154**5
C      DAY = JULIAN DAY NUMBER. WILL BE THE ACTUAL DAY NUMBER IF DAILY        C0155
C      MET DATA ARE USED, OR THE MEDIAN DAY NUMBER FOR THE INTERVAL IF        C0156
C      AVERAGE MET DATA ARE USED. CCL 1-10                                   C0157
C      TMAX = MAXIMUM TEMPERATURE, CCL 11-20                                  C0158
C      TMIN = MINIMUM TEMPERATURE, CCL 21-30                                  C0159**5
C      PRECIP = PRECIPITATION, COL 31-40                                      C0160
C                                                                              C0161

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C      STMAX = STANDARD DEVIATION OF TMAX, CCL 41-50      CC174**5
C      STMIN = STANDARD DEVIATION OF TMIN, CCL 51-60      CC175
C      SPRCP = STANDARD DEVIATION OF PRECIP, CCL 61-70     CC176**5
C      IFLAS = FLAG TO CHECK IF THIS IS THE LAST MET CARD FOR THIS CC177
C      LOCATION YEAR. ENTER 1 IN CCL 80 IF LAST CARD, OTHERWISE LEAVE BLA CC178**5
C      CC179
C      READ(1,111) DAY(IPT),TMAX(IPT),TMIN(IPT),PRECIP(IPT), CC180**5
C      ISTMAX(IPT),STMIN(IPT),SPRCP(IPT),IFLAS           CC181
C      R(IPT)=1./FLCAT(IDAYND-IDAYBG+1)                  CC182
C      IF(ISTAGE.NE.2) GO TO 31                            CC183**4
C      IGRNCF=IDRNCF+365                                   CC184**4
C      IF(IDRMCF.LT.180)IDRMCF=IDRMCF+365                CC185**5
C      IDAY=DAY(IPT)                                       CC186**4
C      IF(IDAY.LT.180) IDAY=IDAY+365                      CC187**5
C      R(IPT)=0.                                           CC188**8
C      IF(IDAY.LT.IDRMCF) R(IPT)=0.5/FLCAT(IDRMCF-IDAYBG) CC189**5
C      IF(IDAY.GT.IGRNCF) R(IPT)=0.5/FLCAT(IDAYND-IGRNCF) CC190**8
C      111 FORMAT(7F10.0,110)                             CC191**5
C      SET UP VARIANCE DEFAULT VALUES AND COMPUTE DAY LENGTH CC192**5
C      31 IF(STMAX(IPT).LT.1.E-15) STMAX(IPT)=5.          CC193**4
C      IF(STMIN(IPT).LT.1.E-15) STMIN(IPT)=5.            CC194**5
C      IF(SPRCP(IPT).LT.1.E-15.AND.PRECIP(IPT).LT.1.E-15) SPRCP(IPT)=.CC195**5
C      IF(SPRCP(IPT).LT.1.E-15.AND.PRECIP(IPT).GT.1.E-15.AND.PRECIP(IPT).CC196**4
C      1LT..05) SPRCP(IPT)=2.*PRECIP(IPT)                CC197**5
C      IF(SPRCP(IPT).LT.1.E-15.AND.PRECIP(IPT).GE..05.AND.PRECIP(IPT).LT. CC198**4
C      1.5) SPRCP(IPT)=PRECIP(IPT)                        CC199**5
C      IF(SPRCP(IPT).LT.1.E-15.AND.PRECIP(IPT).GE..5) SPRCP(IPT)=0.5*PREC CC200**5
C      1IP(IPT)                                             CC201**4
C      DAYLTH(IPT)=12.14+(3.37*CSIN(FLAT/57.295779511)/CCOS(FLAT CC202**4
C      1757.295779511)*CCOS(.6172*DAY(IPT)-2.941))       CC203**5
C      DAYL(IPT)=DAYS(3.370*(1./CCOS(FLAT/57.295779511))*2 CC204**4
C      1*CCOS(.6172*DAY(IPT)-2.941))*SLAT/57.29577951    CC205**5
C      CALL(3,112) DAY(IPT),TMAX(IPT),STMAX(IPT),TMIN(IPT),STMIN(IPT), CC206**4
C      DAYLTH(IPT),SCAYL(IPT),IPT                         CC207**5
C      112 FORMAT(7F10.3,110)                             CC208**4
C      DAYLTH(IPT)=DAYLTH(IPT)-12.                        CC209**5
C      IF(IFLAG.NE.0) GO TO 1111                          CC210**4
C      11 CONTINUE                                         CC211**5
C      1111 CONTINUE                                       CC212**4
C      NPT=IPT                                             CC213**5
C      FORM NORMAL EQUATION MATRICES                      CC214**5
C      WRITE(3,123)(ISTGNM(I),I=1,5)                     CC215**5
C      123 FORMAT(10I,///,10X,'PARAMETER ESTIMATES FOR ',5A4,///) CC216**6
C      WRITE(3,114)                                         CC217**4
C      114 FORMAT(1X,'ITERATION',3X,'H(1/11)',3X,'H(2/12)',3X,'H(3/13)',3X,'H(4/14)',3X,'H(5/15)',3X,'H(6/16)',3X,'H(7/17)',3X,'H(8/18)',3X,'H(9/19)',3X,'H(10/20)',3X,'H(11/21)',3X,'H(12/22)',3X,'H(13/23)',3X,'H(14/24)',3X,'H(15/25)',3X,'H(16/26)',3X,'H(17/27)',3X,'H(18/28)',3X,'H(19/29)',3X,'H(20/30)',3X,'H(21/31)',3X,'H(22/32)',3X,'H(23/33)',3X,'H(24/34)',3X,'H(25/35)',3X,'H(26/36)',3X,'H(27/37)',3X,'H(28/38)',3X,'H(29/39)',3X,'H(30/40)',3X,'H(31/41)',3X,'H(32/42)',3X,'H(33/43)',3X,'H(34/44)',3X,'H(35/45)',3X,'H(36/46)',3X,'H(37/47)',3X,'H(38/48)',3X,'H(39/49)',3X,'H(40/50)',3X,'H(41/51)',3X,'H(42/52)',3X,'H(43/53)',3X,'H(44/54)',3X,'H(45/55)',3X,'H(46/56)',3X,'H(47/57)',3X,'H(48/58)',3X,'H(49/59)',3X,'H(50/60)',3X,'H(51/61)',3X,'H(52/62)',3X,'H(53/63)',3X,'H(54/64)',3X,'H(55/65)',3X,'H(56/66)',3X,'H(57/67)',3X,'H(58/68)',3X,'H(59/69)',3X,'H(60/70)',3X,'H(61/71)',3X,'H(62/72)',3X,'H(63/73)',3X,'H(64/74)',3X,'H(65/75)',3X,'H(66/76)',3X,'H(67/77)',3X,'H(68/78)',3X,'H(69/79)',3X,'H(70/80)',3X,'H(71/81)',3X,'H(72/82)',3X,'H(73/83)',3X,'H(74/84)',3X,'H(75/85)',3X,'H(76/86)',3X,'H(77/87)',3X,'H(78/88)',3X,'H(79/89)',3X,'H(80/90)',3X,'H(81/91)',3X,'H(82/92)',3X,'H(83/93)',3X,'H(84/94)',3X,'H(85/95)',3X,'H(86/96)',3X,'H(87/97)',3X,'H(88/98)',3X,'H(89/99)',3X,'H(90/100)',3X,'H(91/101)',3X,'H(92/102)',3X,'H(93/103)',3X,'H(94/104)',3X,'H(95/105)',3X,'H(96/106)',3X,'H(97/107)',3X,'H(98/108)',3X,'H(99/109)',3X,'H(100/110)',3X,'H(101/111)',3X,'H(102/112)',3X,'H(103/113)',3X,'H(104/114)',3X,'H(105/115)',3X,'H(106/116)',3X,'H(107/117)',3X,'H(108/118)',3X,'H(109/119)',3X,'H(110/120)',3X,'H(111/121)',3X,'H(112/122)',3X,'H(113/123)',3X,'H(114/124)',3X,'H(115/125)',3X,'H(116/126)',3X,'H(117/127)',3X,'H(118/128)',3X,'H(119/129)',3X,'H(120/130)',3X,'H(121/131)',3X,'H(122/132)',3X,'H(123/133)',3X,'H(124/134)',3X,'H(125/135)',3X,'H(126/136)',3X,'H(127/137)',3X,'H(128/138)',3X,'H(129/139)',3X,'H(130/140)',3X,'H(131/141)',3X,'H(132/142)',3X,'H(133/143)',3X,'H(134/144)',3X,'H(135/145)',3X,'H(136/146)',3X,'H(137/147)',3X,'H(138/148)',3X,'H(139/149)',3X,'H(140/150)',3X,'H(141/151)',3X,'H(142/152)',3X,'H(143/153)',3X,'H(144/154)',3X,'H(145/155)',3X,'H(146/156)',3X,'H(147/157)',3X,'H(148/158)',3X,'H(149/159)',3X,'H(150/160)',3X,'H(151/161)',3X,'H(152/162)',3X,'H(153/163)',3X,'H(154/164)',3X,'H(155/165)',3X,'H(156/166)',3X,'H(157/167)',3X,'H(158/168)',3X,'H(159/169)',3X,'H(160/170)',3X,'H(161/171)',3X,'H(162/172)',3X,'H(163/173)',3X,'H(164/174)',3X,'H(165/175)',3X,'H(166/176)',3X,'H(167/177)',3X,'H(168/178)',3X,'H(169/179)',3X,'H(170/180)',3X,'H(171/181)',3X,'H(172/182)',3X,'H(173/183)',3X,'H(174/184)',3X,'H(175/185)',3X,'H(176/186)',3X,'H(177/187)',3X,'H(178/188)',3X,'H(179/189)',3X,'H(180/190)',3X,'H(181/191)',3X,'H(182/192)',3X,'H(183/193)',3X,'H(184/194)',3X,'H(185/195)',3X,'H(186/196)',3X,'H(187/197)',3X,'H(188/198)',3X,'H(189/199)',3X,'H(190/200)',3X,'H(191/201)',3X,'H(192/202)',3X,'H(193/203)',3X,'H(194/204)',3X,'H(195/205)',3X,'H(196/206)',3X,'H(197/207)',3X,'H(198/208)',3X,'H(199/209)',3X,'H(200/210)',3X,'H(201/211)',3X,'H(202/212)',3X,'H(203/213)',3X,'H(204/214)',3X,'H(205/215)',3X,'H(206/216)',3X,'H(207/217)',3X,'H(208/218)',3X,'H(209/219)',3X,'H(210/220)',3X,'H(211/221)',3X,'H(212/222)',3X,'H(213/223)',3X,'H(214/224)',3X,'H(215/225)',3X,'H(216/226)',3X,'H(217/227)',3X,'H(218/228)',3X,'H(219/229)',3X,'H(220/230)',3X,'H(221/231)',3X,'H(222/232)',3X,'H(223/233)',3X,'H(224/234)',3X,'H(225/235)',3X,'H(226/236)',3X,'H(227/237)',3X,'H(228/238)',3X,'H(229/239)',3X,'H(230/240)',3X,'H(231/241)',3X,'H(232/242)',3X,'H(233/243)',3X,'H(234/244)',3X,'H(235/245)',3X,'H(236/246)',3X,'H(237/247)',3X,'H(238/248)',3X,'H(239/249)',3X,'H(240/250)',3X,'H(241/251)',3X,'H(242/252)',3X,'H(243/253)',3X,'H(244/254)',3X,'H(245/255)',3X,'H(246/256)',3X,'H(247/257)',3X,'H(248/258)',3X,'H(249/259)',3X,'H(250/260)',3X,'H(251/261)',3X,'H(252/262)',3X,'H(253/263)',3X,'H(254/264)',3X,'H(255/265)',3X,'H(256/266)',3X,'H(257/267)',3X,'H(258/268)',3X,'H(259/269)',3X,'H(260/270)',3X,'H(261/271)',3X,'H(262/272)',3X,'H(263/273)',3X,'H(264/274)',3X,'H(265/275)',3X,'H(266/276)',3X,'H(267/277)',3X,'H(268/278)',3X,'H(269/279)',3X,'H(270/280)',3X,'H(271/281)',3X,'H(272/282)',3X,'H(273/283)',3X,'H(274/284)',3X,'H(275/285)',3X,'H(276/286)',3X,'H(277/287)',3X,'H(278/288)',3X,'H(279/289)',3X,'H(280/290)',3X,'H(281/291)',3X,'H(282/292)',3X,'H(283/293)',3X,'H(284/294)',3X,'H(285/295)',3X,'H(286/296)',3X,'H(287/297)',3X,'H(288/298)',3X,'H(289/299)',3X,'H(290/300)',3X,'H(291/301)',3X,'H(292/302)',3X,'H(293/303)',3X,'H(294/304)',3X,'H(295/305)',3X,'H(296/306)',3X,'H(297/307)',3X,'H(298/308)',3X,'H(299/309)',3X,'H(300/310)',3X,'H(301/311)',3X,'H(302/312)',3X,'H(303/313)',3X,'H(304/314)',3X,'H(305/315)',3X,'H(306/316)',3X,'H(307/317)',3X,'H(308/318)',3X,'H(309/319)',3X,'H(310/320)',3X,'H(311/321)',3X,'H(312/322)',3X,'H(313/323)',3X,'H(314/324)',3X,'H(315/325)',3X,'H(316/326)',3X,'H(317/327)',3X,'H(318/328)',3X,'H(319/329)',3X,'H(320/330)',3X,'H(321/331)',3X,'H(322/332)',3X,'H(323/333)',3X,'H(324/334)',3X,'H(325/335)',3X,'H(326/336)',3X,'H(327/337)',3X,'H(328/338)',3X,'H(329/339)',3X,'H(330/340)',3X,'H(331/341)',3X,'H(332/342)',3X,'H(333/343)',3X,'H(334/344)',3X,'H(335/345)',3X,'H(336/346)',3X,'H(337/347)',3X,'H(338/348)',3X,'H(339/349)',3X,'H(340/350)',3X,'H(341/351)',3X,'H(342/352)',3X,'H(343/353)',3X,'H(344/354)',3X,'H(345/355)',3X,'H(346/356)',3X,'H(347/357)',3X,'H(348/358)',3X,'H(349/359)',3X,'H(350/360)',3X,'H(351/361)',3X,'H(352/362)',3X,'H(353/363)',3X,'H(354/364)',3X,'H(355/365)',3X,'H(356/366)',3X,'H(357/367)',3X,'H(358/368)',3X,'H(359/369)',3X,'H(360/370)',3X,'H(361/371)',3X,'H(362/372)',3X,'H(363/373)',3X,'H(364/374)',3X,'H(365/375)',3X,'H(366/376)',3X,'H(367/377)',3X,'H(368/378)',3X,'H(369/379)',3X,'H(370/380)',3X,'H(371/381)',3X,'H(372/382)',3X,'H(373/383)',3X,'H(374/384)',3X,'H(375/385)',3X,'H(376/386)',3X,'H(377/387)',3X,'H(378/388)',3X,'H(379/389)',3X,'H(380/390)',3X,'H(381/391)',3X,'H(382/392)',3X,'H(383/393)',3X,'H(384/394)',3X,'H(385/395)',3X,'H(386/396)',3X,'H(387/397)',3X,'H(388/398)',3X,'H(389/399)',3X,'H(390/400)',3X,'H(391/401)',3X,'H(392/402)',3X,'H(393/403)',3X,'H(394/404)',3X,'H(395/405)',3X,'H(396/406)',3X,'H(397/407)',3X,'H(398/408)',3X,'H(399/409)',3X,'H(400/410)',3X,'H(401/411)',3X,'H(402/412)',3X,'H(403/413)',3X,'H(404/414)',3X,'H(405/415)',3X,'H(406/416)',3X,'H(407/417)',3X,'H(408/418)',3X,'H(409/419)',3X,'H(410/420)',3X,'H(411/421)',3X,'H(412/422)',3X,'H(413/423)',3X,'H(414/424)',3X,'H(415/425)',3X,'H(416/426)',3X,'H(417/427)',3X,'H(418/428)',3X,'H(419/429)',3X,'H(420/430)',3X,'H(421/431)',3X,'H(422/432)',3X,'H(423/433)',3X,'H(424/434)',3X,'H(425/435)',3X,'H(426/436)',3X,'H(427/437)',3X,'H(428/438)',3X,'H(429/439)',3X,'H(430/440)',3X,'H(431/441)',3X,'H(432/442)',3X,'H(433/443)',3X,'H(434/444)',3X,'H(435/445)',3X,'H(436/446)',3X,'H(437/447)',3X,'H(438/448)',3X,'H(439/449)',3X,'H(440/450)',3X,'H(441/451)',3X,'H(442/452)',3X,'H(443/453)',3X,'H(444/454)',3X,'H(445/455)',3X,'H(446/456)',3X,'H(447/457)',3X,'H(448/458)',3X,'H(449/459)',3X,'H(450/460)',3X,'H(451/461)',3X,'H(452/462)',3X,'H(453/463)',3X,'H(454/464)',3X,'H(455/465)',3X,'H(456/466)',3X,'H(457/467)',3X,'H(458/468)',3X,'H(459/469)',3X,'H(460/470)',3X,'H(461/471)',3X,'H(462/472)',3X,'H(463/473)',3X,'H(464/474)',3X,'H(465/475)',3X,'H(466/476)',3X,'H(467/477)',3X,'H(468/478)',3X,'H(469/479)',3X,'H(470/480)',3X,'H(471/481)',3X,'H(472/482)',3X,'H(473/483)',3X,'H(474/484)',3X,'H(475/485)',3X,'H(476/486)',3X,'H(477/487)',3X,'H(478/488)',3X,'H(479/489)',3X,'H(480/490)',3X,'H(481/491)',3X,'H(482/492)',3X,'H(483/493)',3X,'H(484/494)',3X,'H(485/495)',3X,'H(486/496)',3X,'H(487/497)',3X,'H(488/498)',3X,'H(489/499)',3X,'H(490/500)',3X,'H(491/501)',3X,'H(492/502)',3X,'H(493/503)',3X,'H(494/504)',3X,'H(495/505)',3X,'H(496/506)',3X,'H(497/507)',3X,'H(498/508)',3X,'H(499/509)',3X,'H(500/510)',3X,'H(501/511)',3X,'H(502/512)',3X,'H(503/513)',3X,'H(504/514)',3X,'H(505/515)',3X,'H(506/516)',3X,'H(507/517)',3X,'H(508/518)',3X,'H(509/519)',3X,'H(510/520)',3X,'H(511/521)',3X,'H(512/522)',3X,'H(513/523)',3X,'H(514/524)',3X,'H(515/525)',3X,'H(516/526)',3X,'H(517/527)',3X,'H(518/528)',3X,'H(519/529)',3X,'H(520/530)',3X,'H(521/531)',3X,'H(522/532)',3X,'H(523/533)',3X,'H(524/534)',3X,'H(525/535)',3X,'H(526/536)',3X,'H(527/537)',3X,'H(528/538)',3X,'H(529/539)',3X,'H(530/540)',3X,'H(531/541)',3X,'H(532/542)',3X,'H(533/543)',3X,'H(534/544)',3X,'H(535/545)',3X,'H(536/546)',3X,'H(537/547)',3X,'H(538/548)',3X,'H(539/549)',3X,'H(540/550)',3X,'H(541/551)',3X,'H(542/552)',3X,'H(543/553)',3X,'H(544/554)',3X,'H(545/555)',3X,'H(546/556)',3X,'H(547/557)',3X,'H(548/558)',3X,'H(549/559)',3X,'H(550/560)',3X,'H(551/561)',3X,'H(552/562)',3X,'H(553/563)',3X,'H(554/564)',3X,'H(555/565)',3X,'H(556/566)',3X,'H(557/567)',3X,'H(558/568)',3X,'H(559/569)',3X,'H(560/570)',3X,'H(561/571)',3X,'H(562/572)',3X,'H(563/573)',3X,'H(564/574)',3X,'H(565/575)',3X,'H(566/576)',3X,'H(567/577)',3X,'H(568/578)',3X,'H(569/579)',3X,'H(570/580)',3X,'H(571/581)',3X,'H(572/582)',3X,'H(573/583)',3X,'H(574/584)',3X,'H(575/585)',3X,'H(576/586)',3X,'H(577/587)',3X,'H(578/588)',3X,'H(579/589)',3X,'H(580/590)',3X,'H(581/591)',3X,'H(582/592)',3X,'H(583/593)',3X,'H(584/594)',3X,'H(585/595)',3X,'H(586/596)',3X,'H(587/597)',3X,'H(588/598)',3X,'H(589/599)',3X,'H(590/600)',3X,'H(591/601)',3X,'H(592/602)',3X,'H(593/603)',3X,'H(594/604)',3X,'H(595/605)',3X,'H(596/606)',3X,'H(597/607)',3X,'H(598/608)',3X,'H(599/609)',3X,'H(600/610)',3X,'H(601/611)',3X,'H(602/612)',3X,'H(603/613)',3X,'H(604/614)',3X,'H(605/615)',3X,'H(606/616)',3X,'H(607/617)',3X,'H(608/618)',3X,'H(609/619)',3X,'H(610/620)',3X,'H(611/621)',3X,'H(612/622)',3X,'H(613/623)',3X,'H(614/624)',3X,'H(615/625)',3X,'H(616/626)',3X,'H(617/627)',3X,'H(618/628)',3X,'H(619/629)',3X,'H(620/630)',3X,'H(621/631)',3X,'H(622/632)',3X,'H(623/633)',3X,'H(624/634)',3X,'H(625/635)',3X,'H(626/636)',3X,'H(627/637)',3X,'H(628/638)',3X,'H(629/639)',3X,'H(630/640)',3X,'H(631/641)',3X,'H(632/642)',3X,'H(633/643)',3X,'H(634/644)',3X,'H(635/645)',3X,'H(636/646)',3X,'H(637/647)',3X,'H(638/648)',3X,'H(639/649)',3X,'H(640/650)',3X,'H(641/651)',3X,'H(642/652)',3X,'H(643/653)',3X,'H(644/654)',3X,'H(645/655)',3X,'H(646/656)',3X,'H(647/657)',3X,'H(648/658)',3X,'H(649/659)',3X,'H(650/660)',3X,'H(651/661)',3X,'H(652/662)',3X,'H(653/663)',3X,'H(654/664)',3X,'H(655/665)',3X,'H(656/666)',3X,'H(657/667)',3X,'H(658/668)',3X,'H(659/669)',3X,'H(660/670)',3X,'H(661/671)',3X,'H(662/672)',3X,'H(663/673)',3X,'H(664/674)',3X,'H(665/675)',3X,'H(666/676)',3X,'H(667/677)',3X,'H(668/678)',3X,'H(669/679)',3X,'H(670/680)',3X,'H(671/681)',3X,'H(672/682)',3X,'H(673/683)',3X,'H(674/684)',3X,'H(675/685)',3X,'H(676/686)',3X,'H(677/687)',3X,'H(678/688)',3X,'H(679/689)',3X,'H(680/690)',3X,'H(681/691)',3X,'H(682/692)',3X,'H(683/693)',3X,'H(684/694)',3X,'H(685/695)',3X,'H(686/696)',3X,'H(687/697)',3X,'H(688/698)',3X,'H(689/699)',3X,'H(690/700)',3X,'H(691/701)',3X,'H(692/702)',3X,'H(693/703)',3X,'H(694/704)',3X,'H(695/705)',3X,'H(696/706)',3X,'H(697/707)',3X,'H(698/708)',3X,'H(699/709)',3X,'H(700/710)',3X,'H(701/711)',3X,'H(702/712)',3X,'H(703/713)',3X,'H(704/714)',3X,'H(705/715)',3X,'H(706/716)',3X,'H(707/717)',3X,'H(708/718)',3X,'H(709/719)',3X,'H(710/720)',3X,'H(711/721)',3X,'H(712/722)',3X,'H(713/723)',3X,'H(714/724)',3X,'H(715/725)',3X,'H(716/726)',3X,'H(717/727)',3X,'H(718/728)',3X,'H(719/729)',3X,'H(720/730)',3X,'H(721/731)',3X,'H(722/732)',3X,'H(723/733)',3X,'H(724/734)',3X,'H(725/735)',3X,'H(726/736)',3X,'H(727/737)',3X,'H(728/738)',3X,'H(729/739)',3X,'H(730/740)',3X,'H(731/741)',3X,'H(732/742)',3X,'H(733/743)',3X,'H(734/744)',3X,'H(735/745)',3X,'H(736/746)',3X,'H(737/747)',3X,'H(738/748)',3X,'H(739/749)',3X,'H(740/750)',3X,'H(741/751)',3X,'H(742/752)',3X,'H(743/753)',3X,'H(744/754)',3X,'H(745/755)',3X,'H(746/756)',3X,'H(747/757)',3X,'H(748/758)',3X,'H(749/759)',3X,'H(750/760)',3X,'H(751/761)',3X,'H(752/762)',3X,'H(753/763)',3X,'H(754/764)',3X,'H(755/765)',3X,'H(756/766)',3X,'H(757/767)',3X,'H(758/768)',3X,'H(759/769)',3X,'H(760/770)',3X,'H(761/771)',3X,'H(762/772)',3X,'H(763/773)',3X,'H(764/774)',3X,'H(765/775)',3X,'H(766/776)',3X,'H(767/777)',3X,'H(768/778)',3X,'H(769/779)',3X,'H(770/780)',3X,'H(771/781)',3X,'H(772/782)',3X,'H(773/783)',3X,'H(774/784)',3X,'H(775/785)',3X,'H(776/786)',3X,'H(777/787)',3X,'H(778/788)',3X,'H(779/789)',3X,'H(780/790)',3X,'H(781/791)',3X,'H(782/792)',3X,'H(783/793)',3X,'H(784/794)',3X,'H(785/795)',3X,'H(786/796)',3X,'H(787/797)',3X,'H(788/798)',3X,'H(789/799)',3X,'H(790/800)',3X,'H(791/801)',3X,'H(792/802)',3X,'H(793/803)',3X,'H(794/804)',3X,'H(795/805)',3X,'H(796/806)',3X,'H(797/807)',3X,'H(798/808)',3X,'H(799/809)',3X,'H(800/810)',3X,'H(801/811)',3X,'H(802/812)',3X,'H(803/813)',3X,'H(804/814)',3X,'H(805/815)',3X,'H(806/816)',3X,'H(807/817)',3X,'H(808/818)',3X,'H(809/819)',3X,'H(810/820)',3X,'H(811/821)',3X,'H(812/822)',3X,'H(813/823)',3X,'H(814/824)',3X,'H(815/825)',3X,'H(816/826)',3X,'H(817/827)',3X,'H(818/828)',3X,'H(819/829)',3X,'H(820/830)',3X,'H(821/831)',3X,'H(822/832)',3X,'H(823/833)',3X,'H(824/834)',3X,'H(825/835)',3X,'H(826/836)',3X,'H(827/837)',3X,'H(828/838)',3X,'H(829/839)',3X,'H(830/840)',3X,'H(831/841)',3X,'H(832/842)',3X,'H(833/843)',3X,'H(834/844)',3X,'H(835/845)',3X,'H(836/846)',3X,'H(837/847)',3X,'H(838/848)',3X,'H(839/849)',3X,'H(840/850)',3X,'H(841/851)',3X,'H(842/852)',3X,'H(843/853)',3X,'H(844/854)',3X,'H(845/855)',3X,'H(846/856)',3X,'H(847/857)',3X,'H(848/858)',3
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0089		T(I)=0.	CC232**5
0090		DO 8 J=1,NPAR	CC233**5
0091		EN(I,J)=0.	CC234**5
0092	8	CONTINUE	CC235
0093	9	CONTINUE	CC236
0094		SSI=0.	CC237**5
0095		DO 21 K=1,NPT	CC238**5
0096		RATE=R(K)	CC239**5
0097		TX=TXMAX(K)	CC240**5
0098		TX=TXMIN(K)	CC241**5
0099		DL=DAYLTH(K)	CC242**5
0100		PR=PRECIP(K)	CC243**5
0101		SSI=SSI+EF(H,1,0.,ISTAGE)**2	CC244**5
0102		DO 18 J=1,NPAR	CC245**5
0103	18	R(J)=(EF(H,J,DH(J),ISTAGE)-EF(H,1,0.,ISTAGE))/DH(J)	CC246**5
0104	335	FORMAT(10E12.4)	CC247**4
0105		DO 20 I=1,NPAR	CC248**5
0106		DO 19 J=1,NPAR	CC249**5
0107		EN(I,J)=EN(I,J)+S(I)*R(J)	CC250**5
0108	19	CONTINUE	CC251
0109		T(I)=T(I)+S(I)*(-EF(H,1,0.,ISTAGE))	CC252**5
0110	20	CONTINUE	CC253
0111	21	CONTINUE	CC254
		UPDATE PARAMETERS	CC255
0112		CALL MINVDP(EN,NPAR,1,0-15,01,20,X,J2,I2)	CC256**4
0113		DO 23 I=1,NPAR	CC257**5
0114		DELH(I)=0.	CC258**5
0115		DO 222 J=1,NPAR	CC259**5
0116		DELH(I)=DELH(I)+EN(I,J)*T(J)	CC260**5
0117	222	CONTINUE	CC261**5
0118		H(I)=H(I)+DELH(I)	CC262**5
0119	23	CONTINUE	CC263**5
0120		SS=0	CC264**5
0121		DO 24 I=1,NPT	CC265**5
0122		RATE=R(I)	CC266**5
0123		TX=TXMAX(I)	CC267**5
0124		TX=TXMIN(I)	CC268**5
0125		DL=DAYLTH(I)	CC269**5
0126		PR=PRECIP(I)	CC270**5
0127		SS=SS+EF(H,1,0.,ISTAGE)**2	CC271**5
0128	24	CONTINUE	CC272**5
0129		WRITE(3,115) I,RATE,(H(I),I=1,20)	CC273**5
0130	115	FORMAT(15,715.6,9F10.6/12X,10F10.6)	CC274**5
0131		IF(DABS((SSI-SS)/SSI).LT..05) GO TO 25	CC275**4
0132	22	CONTINUE	CC276**5
		COMPUTE COVARIANCE AND CORRELATION MATRICES FOR PARAMETERS	CC277
0133	25	WRITE(3,121)	CC278
0134	121	FORMAT(///,10X,' COFACTOR MATRIX FOR PARAMETERS',//)	CC279**4
0135		DO 13 I=1,NPAR	CC280**5
0136		WRITE(3,120) (EN(I,J),J=1,NPAR)	CC281**5
0137	120	FORMAT(10D12.4/(5X,10D12.4))	CC282**4
0138	13	CONTINUE	CC283**5
0139		DGREF=NPT-NPAR	CC284**5
0140		SSSQ=SS/DGREF	CC285**5

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0141      DO 33 I=1,NPAR                      CC290**5
0142      DO 32 J=1,NPAR                      CC291**5
0143      EN(I,J)=SOSQ*EN(I,J)               CC292**5
0144      32 CONTINUE                        CC293**5
0145      33 CONTINUE                        CC294**5
0146      WRITE(3,127)                       CC295**4
0147      127 FORMAT(777,10X,'COVARIANCE MATRIX FOR PARAMETERS',777) CC296**6
0148      DO 34 I=1,NPAR                      CC297**5
0149      34 WRITE(3,120)(EN(I,J),J=1,NPAR)   CC298**5
0150      DO 15 I=1,NPAR                      CC299**5
0151      15 S(I)=DSORT(EN(I,I))              CC300**5
0152      DO 17 I=1,NPAR                      CC301**5
0153      DO 27 J=1,NPAR                      CC302**5
0154      EN(I,J)=EN(I,J)/(S(I)*S(J))        CC303**5
0155      27 CONTINUE                        CC304**5
0156      17 CONTINUE                        CC305**5
0157      WRITE(3,122)                       CC306**4
0158      122 FORMAT(777,10X,'CORRELATION MAIRIX') CC307**6
0159      DO 28 I=1,NPAR                      CC308**5
0160      WRITE(3,124)(EN(I,J),J=1,NPAR)      CC309**5
0161      124 FORMAT(10F10.6/2X,10F10.6)     CC310**4
0162      28 CONTINUE                        CC311**5
0163      C                                     CC312**5
0164      C                                     CC313**5
0165      C                                     CC314**5
0166      WRITE(3,1115)                       CC315**4
0167      1115 FORMAT(1H1,7777,10X,'RESULTING RATE PREDICTIONS',7777,14X,'DAY',13X CC316**6
0168      1,'TMAX',13X,'TMIN',11X,'DAYLTH',11X,'PRECIP',8X,'CBS. RATE', CC317**6
0169      27X,'COMP. RATE')                  CC318**6
0170      WRITE(3,117)                         CC319**4
0171      117 FORMAT(93X,'(AVERAGE)',7X,'(PREDICTED)') CC320**6
0172      SMRATE=0.                           CC321**5
0173      DO 26 I=1,NPT                      CC322**5
0174      RATE=R(I)                          CC323**5
0175      TA=TMAX(I)                         CC324**5
0176      TB=TMIN(I)                         CC325**5
0177      DL=DAYLTH(I)                      CC326**5
0178      PR=PRECIP(I)                      CC327**5
0179      RATE=R(I)-EF(H,1,0.,1STAGE)        CC328**5
0180      SMRATE=SMRATE+RATE                 CC329**5
0181      DAYLTH(I)=DAYLTH(I)+12.            CC330**5
0182      IF (CABS(R(I)-R(I+1)).LT.1.D-15) GO TO 30 CC331**9
0183      29 WRITE(3,116) I,DAY(I),TMAX(I),TMIN(I),DAYLTH(I),PRECIP(I),R(I), CC332**4
0184      1,RATE                             CC333**5
0185      SMRATE=0.                           CC334**5
0186      GO TO 26                            CC335**5
0187      30 WRITE(3,116) I,DAY(I),TMAX(I),TMIN(I),DAYLTH(I),PRECIP(I),R(I), CC336**4
0188      1,RATE                             CC337**5
0189      116 FORMAT(17,F10.1,4F17.3,2F17.7,F10.6) CC338**4
0190      26 CONTINUE                        CC339**5
0191      WRITE(3,119) SOSQ                   CC340**4
0192      119 FORMAT(777,5X,'REFERENCE VARIANCE ='',E15.5) CC341**6
0193      WRITE(3,125) DDFREE                 CC342**4
0194      125 FORMAT(77,5X,'DEGREES OF FREEDOM ='',F10.0) CC343**6
0195      GO TO 2222                          CC344**5
0196      1 WRITE(3,118)                     CC345**4
0197      118 FORMAT(7777,20X,'*** NORMAL EQUATION MATRIX IS ILL CONDITIONED ***' CC346**6
0198      1,777)                             CC347**5

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MAINPGM

DATE 08/19/77

TIME

15.02.CC

0191
0192
0193

2222 CONTINUE
CALL EXIT
END

CC348
CC349
CC350

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0001	DOUBLE PRECISION FUNCTION EF(H,JH,DH,I)	CC437**9
0002	IMPLICIT REAL*8(A-F,O-Z)	CC438**9
0003	DIMENSION H(20),G(7)	CC439**4
0004	COMMON G	CC440
0005	EQUIVALENCE (G(1),RATE),(G(2),TX),(G(3),TM),(G(4),DL)	CC441**4
0006	EQUIVALENCE (G(5),PR),(G(6),ELAI),(G(7),ELEV)	CC442**4
0007	H(JH)=H(JH)+DH	CC443**5
0008	IF(I.EQ.1) GO TO 1	CC444**5
0009	EF=RATE-DEXP(H(1)+H(2)*TX+H(3)*TM+H(4)*DL+H(5)*TX*DL+H(6)*TM*DL	*12
	+H(7)*TX*TM)	*12
0010	GO TO 2	CC447**5
0011	1 EF=RATE-DEXP(H(1)+H(2)*TX+H(3)*TM+H(4)*TX*TM)	*12
0012	2 H(JH)=H(JH)-DH	CC450**5
0013	RETURN	CC451
0014	END	CC452

0001	C*	SUBROUTINE MINVDP(A,N,E,C,J8,X,J2,I2)	CC351**4
	C**	MATRIX INVERSION ROUTINE--FORMULATED BY E. G. CLAYTON	CC352
	C***	--- CALLING SEQUENCE ---	CC353
	C****	CALL MINVDP(A,N,E,K)	CC354**4
	C****	A-- SQUARE ARRAY (DOUBLE PRECISION) CONTAINING ORIGINAL MATRIX	CC355**4
	C****	N-- ORDER OF ORIGINAL MATRIX	CC356
	C****	E-- TEST CRITERION FOR NEAR ZERO DIVISOR (DOUBLE PRECISION)	CC357**4
	C****	K-- LOCATION FOR SINGULARITY OR ILL-CONDITION INDICATOR	CC358
	C**	K=0 =) MATRIX NONSINGULAR.	CC359**5
	C*	K=1 =) MATRIX SINGULAR (OR ILL-CONDITIONED)	CC360**5
0002		DOUBLE PRECISION A,X,BIGA,DIV,E	CC361
0003		DIMENSION A(J8,J8),X(J8),J2(J8),I2(J8)	CC362**4
	C*	INITIALIZATION	CC363
0004		M=N	CC364**5
0005		K=0	CC365**5
0006		I2(1)=0	CC366**5
0007		J2(1)=0	CC367**5
	C*	BEGIN COMPUTATION OF THE INVERSE	CC368
0008		DO 13 L=1,M	CC369**5
0009		L1=L-1	CC370**5
0010		BIGA=0.000	CC371**5
	C*	LOOK FOR THE ELEMENT OF GREATEST ABSOLUTE VALUE, CHOOSE	CC372
	C*	ONE FROM A ROW AND COLUMN NOT PREVIOUSLY USED.	CC373
0011		DO 5 I=1,M	CC374**5
0012		DO 1 I3=1,L1	CC375**5
0013		IF(I-I2(I3))1,5,1	CC376**4
0014	1	CONTINUE	CC377
0015		DO 4 J=1,M	CC378**5
0016		DO 2 I3=1,L1	CC379**5
0017		IF(J-J2(I3))2,4,2	CC380**4
0018	2	CONTINUE	CC381
0019		IF(BIGA-DABS(A(I,J)))3,3,4	CC382**4
0020	3	BIGA=DABS(A(I,J))	CC383**5
0021		J1=J	CC384**5
0022		I1=I	CC385**5
0023	4	CONTINUE	CC386
0024	5	CONTINUE	CC387
	C*	TAG THE ROW AND COLUMN FROM WHICH THE ELEMENT IS CHOSEN.	CC388
0025		J2(L)=J1	CC389**5
0026		I2(L)=I1	CC390**5
0027		DIV=A(I1,J1)	CC391**5
	C*	TEST ELEMENT AGAINST ZERO CRITERION.	CC392
0028	C*	IF(DABS(DIV)-E)221,221,6	CC393**4
	C*	PERFORM THE COMPUTATIONS	CC394
0029	6	DO 7 J=1,M	CC395**5
0030		A(I1,J)=A(I1,J)/DIV	CC396**5
0031	7	CONTINUE	CC397
0032		A(I1,J1)=1.000/DIV	CC398**5
0033		DO 11 I=1,M	CC399**5
0034		IF(I1-I)8,11,8	CC400**4
0035	8	DO 10 J=1,M	CC401**5
0036		IF(J1-J)9,10,9	CC402**4
0037	9	A(I1,J)=A(I,J)-A(I1,J)*A(I,J1)	CC403**5
0038	10	CONTINUE	CC404
0039	11	CONTINUE	CC405
0040		DO 14 I=1,M	CC406**5
0041		IF(I1-I)13,14,13	CC407**4
0042	13	A(I,J1)=-A(I,J1)+A(I1,J1)	CC408**5

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0043	14	CONTINUE	CC409
0044	15	CONTINUE	CC410
	C*	COMPUTATION COMPLETE AT THIS POINT	CC411
	C*	UNSCRAMBLE THE INVERSE	CC412
0045		DO 18 J=1,M	CC413**5
0046		DO 16 I=1,M	CC414**5
0047		I1=I2(I)	CC415**5
0048		J1=J2(I)	CC416**5
0049		X(J1)=A(I1,J)	CC417**5
0050	16	CONTINUE	CC418
0051		DO 17 I=1,M	CC419**5
0052		A(I,J)=X(I)	CC420**5
0053	17	CONTINUE	CC421
0054	18	CONTINUE	CC422
0055		DO 21 I=1,M	CC423**5
0056		DO 19 J=1,M	CC424**5
0057		I1=I2(J)	CC425**5
0058		J1=J2(J)	CC426**5
0059		X(I1)=A(I,J1)	CC427**5
0060	19	CONTINUE	CC428
0061		DO 20 J=1,M	CC429**5
0062		A(I,J)=X(J)	CC430**5
0063	20	CONTINUE	CC431
0064	21	CONTINUE	CC432
0065		RETURN	CC433
0066	221	K=1	CC434**5
0067		RETURN 4	CC435
0068		END	CC436

REGRESSION FOR WINTER WHEAT FROM STAGE 2 TO STAGE 3 - JOINT-HEAD

NUMBER OF LOCATION-YEARS = 44

NUMBER OF VARIABLES CHOSEN (TMAX, TMIN, DAYLTH, PRECIP, LATITUDE, ELEV) = 3
 NUMBER OF OBSERVED QUANTITIES PER EQUATION = 1
 NUMBER OF H. PARAMETERS = 7
 FOR EQUATION OF THE FORM

$$RATE = EXP(H(1)) (H(2) + TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TX * TM + H(7) * TX * TM)$$

REGION = 8353 CROP YEAR = 1965
 STAGE RUNS FROM DAY 125 TO DAY 140
 LATITUDE = 39.502 STD DEV = 0.303
 LONGITUDE = 95.364 STD DEV = 0.726
 ELEVATION = 338.328 STD DEV = 9.677

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
132.500	26.500	3.110	13.640	3.880	14.393	0.024

REGION = 8355 CROP YEAR = 1965
 STAGE RUNS FROM DAY 115 TO DAY 134
 LATITUDE = 38.620 STD DEV = 0.267
 LONGITUDE = 98.152 STD DEV = 1.073
 ELEVATION = 488.765 STD DEV = 121.184

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
124.500	24.570	7.350	9.700	6.330	14.020	0.018

REGION = 8356 CROP YEAR = 1965
 STAGE RUNS FROM DAY 121 TO DAY 136
 LATITUDE = 35.612 STD DEV = 0.372
 LONGITUDE = 95.760 STD DEV = 0.754
 ELEVATION = 327.184 STD DEV = 41.421

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
128.500	27.380	2.440	16.040	3.810	14.146	0.027

REGION = 8357 CROP YEAR = 1965
 STAGE RUNS FROM DAY 105 TO DAY 134
 LATITUDE = 37.662 STD DEV = 0.396
 LONGITUDE = 100.626 STD DEV = 0.751
 ELEVATION = 812.393 STD DEV = 157.495

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
119.500	25.710	5.950	9.070	4.910	13.732	0.023

124.500 24.870 7.350 7.700 6.330 14.020 0.018 2

REGION = KNS6 CROP YEAR = 1965
 STAGE RUNS FROM DAY 121 TO DAY 124
 LATITUDE = 34.612 STD DEV = 0.372
 LONGITUDE = 95.760 STD DEV = 0.754
 ELEVATION = 329.184 STD DEV = 41.423

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV

128.500 27.380 2.440 19.040 3.810 14.146 0.027 3

REGION = KNS7 CROP YEAR = 1965
 STAGE RUNS FROM DAY 105 TO DAY 114
 LATITUDE = 37.562 STD DEV = 0.326
 LONGITUDE = 100.626 STD DEV = 0.751
 ELEVATION = 412.353 STD DEV = 157.405

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV

112.500 25.710 5.950 8.070 4.910 13.782 0.023 4

REGION = KNSP CROP YEAR = 1965
 STAGE RUNS FROM DAY 110 TO DAY 120
 LATITUDE = 37.640 STD DEV = 0.421
 LONGITUDE = 98.270 STD DEV = 0.915
 ELEVATION = 501.346 STD DEV = 114.156

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV

119.500 26.660 5.740 10.920 5.430 13.789 0.025 5

REGION = KNP1 CROP YEAR = 1970
 STAGE RUNS FROM DAY 156 TO DAY 177
 LATITUDE = 48.483 STD DEV = 0.351
 LONGITUDE = 103.793 STD DEV = 0.754
 ELEVATION = 611.368 STD DEV = 54.590

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV

156.500 26.450 4.630 12.000 2.850 12.226 0.047 6

REGION = KOK4 CROP YEAR = 1970
 STAGE RUNS FROM DAY 156 TO DAY 173
 LATITUDE = 52.952 STD DEV = 11.867
 LONGITUDE = 102.237 STD DEV = 1.194
 ELEVATION = 621.914 STD DEV = 59.360

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV

164.500 26.920 4.720 11.860 2.820 16.577 1.911 7

REGION = KOK7 CROP YEAR = 1970
 STAGE RUNS FROM DAY 156 TO DAY 175
 LATITUDE = 46.643 STD DEV = 0.432
 LONGITUDE = 103.050 STD DEV = 0.677

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
165.500	25.530	4.100	11.370	2.640	15.673	0.035

REGION = NOK8
 STAGE RUNS FROM DAY 166 TO DAY 175
 CROP YEAR = 1970
 LATITUDE = 46.684 STD DEV = 0.251
 LONGITUDE = 101.187 STD DEV = 0.773
 ELEVATION = 633.557 STD DEV = 105.299

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
171.000	25.500	2.860	10.700	2.730	15.669	0.037

REGION = NOK8
 STAGE RUNS FROM DAY 167 TO DAY 171
 CROP YEAR = 1970
 LATITUDE = 46.617 STD DEV = 0.251
 LONGITUDE = 98.387 STD DEV = 0.773
 ELEVATION = 457.698 STD DEV = 137.843

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
159.000	22.240	4.210	10.610	3.330	15.667	0.032

REGION = NOK8
 STAGE RUNS FROM DAY 120 TO DAY 144
 CROP YEAR = 1965
 LATITUDE = 37.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.773
 ELEVATION = 868.175 STD DEV = 190.254

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
130.000	25.170	4.330	10.130	4.830	14.413	0.017

REGION = NOK8
 STAGE RUNS FROM DAY 121 TO DAY 138
 CROP YEAR = 1965
 LATITUDE = 37.520 STD DEV = 0.211
 LONGITUDE = 98.388 STD DEV = 0.773
 ELEVATION = 500.725 STD DEV = 116.982

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
129.500	27.510	3.760	12.370	3.830	14.242	0.022

REGION = NOK8
 STAGE RUNS FROM DAY 128 TO DAY 144
 CROP YEAR = 1965
 LATITUDE = 37.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.773
 ELEVATION = 864.375 STD DEV = 190.254

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
130.000	25.170	4.330	10.130	4.830	14.413	0.017

REGION = NOK8
 STAGE RUNS FROM DAY 121 TO DAY 138
 CROP YEAR = 1965

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129.500 25.170 4.330 10.130 4.830 14.433 0.017 11

REGION = KNS2 CROP YEAR = 1965
 STAGE RUNS FROM DAY 121 TO DAY 138
 LATITUDE = 39.200 STD DEV = 0.292
 LONGITUDE = 98.338 STD DEV = 0.173
 ELEVATION = 500.725 STD DEV = 116.002

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 129.500 27.530 3.760 12.370 3.830 14.242 0.022 12

REGION = KNS1 CROP YEAR = 1965
 STAGE RUNS FROM DAY 128 TO DAY 144
 LATITUDE = 39.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.173
 ELEVATION = 854.375 STD DEV = 190.254

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 130.000 25.170 4.330 10.130 4.830 14.433 0.017 13

REGION = KNS2 CROP YEAR = 1965
 STAGE RUNS FROM DAY 121 TO DAY 138
 LATITUDE = 39.200 STD DEV = 0.292
 LONGITUDE = 98.338 STD DEV = 0.173
 ELEVATION = 500.725 STD DEV = 116.002

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 130.500 27.530 3.760 12.370 3.830 14.242 0.022 14

REGION = KNSV CROP YEAR = 1965
 STAGE RUNS FROM DAY 110 TO DAY 130
 LATITUDE = 38.170 STD DEV = 0.656
 LONGITUDE = 25.770 STD DEV = 0.161
 ELEVATION = 343.205 STD DEV = 45.773

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 120.000 25.840 5.130 12.440 5.830 13.837 0.040 15

REGION = CLCA CROP YEAR = 1972
 STAGE RUNS FROM DAY 120 TO DAY 145
 LATITUDE = 32.410 STD DEV = 0.475
 LONGITUDE = 101.338 STD DEV = 0.952
 ELEVATION = 1446.323 STD DEV = 326.730

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 132.500 20.800 6.330 4.910 4.020 14.326 0.037 16

REGION = CK11 CROP YEAR = 1966
 STAGE RUNS FROM DAY 97 TO DAY 125
 LATITUDE = 36.621 STD DEV = 0.237
 LONGITUDE = 100.987 STD DEV = 1.297
 ELEVATION = 903.198 STD DEV = 246.831

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
111.000	22.330	5.230	4.250	3.940	13.428	0.011	17

REGION = OKL2 CROP YEAR = 1966
 STAGE RUNS FROM DAY 94 TO DAY 119
 LATITUDE = 36.523 STD DEV = 0.255
 LONGITUDE = 94.227 STD DEV = 0.926
 ELEVATION = 414.711 STD DEV = 197.573

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
126.500	21.490	5.130	5.280	4.880	13.254	0.011	18

REGION = OKL3 CROP YEAR = 1966
 STAGE RUNS FROM DAY 102 TO DAY 124
 LATITUDE = 36.500 STD DEV = 0.397
 LONGITUDE = 95.690 STD DEV = 0.735
 ELEVATION = 217.505 STD DEV = 22.243

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
113.000	22.100	5.500	7.970	4.280	13.475	0.020	19

REGION = OKL4 CROP YEAR = 1966
 STAGE RUNS FROM DAY 96 TO DAY 120
 LATITUDE = 35.917 STD DEV = 0.238
 LONGITUDE = 92.347 STD DEV = 44.958
 ELEVATION = 575.286 STD DEV = 111.297

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
134.000	22.370	4.570	6.940	4.170	13.257	0.012	20

REGION = OKL5 CROP YEAR = 1966
 STAGE RUNS FROM DAY 94 TO DAY 122
 LATITUDE = 35.910 STD DEV = 0.407
 LONGITUDE = 97.213 STD DEV = 0.762
 ELEVATION = 222.242 STD DEV = 34.972

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
108.000	22.250	5.160	7.290	4.570	13.268	0.017	21

REGION = OKL6 CROP YEAR = 1966
 STAGE RUNS FROM DAY 105 TO DAY 124
 LATITUDE = 35.387 STD DEV = 0.437
 LONGITUDE = 95.287 STD DEV = 0.335
 ELEVATION = 214.335 STD DEV = 23.447

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
114.500	22.460	5.330	9.770	4.080	13.492	0.022	22

REGION = OKL7 CROP YEAR = 1966
 STAGE RUNS FROM DAY 91 TO DAY 114
 LATITUDE = 34.671 STD DEV = 0.783

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114.000 22.370 4.570 6.940 4.170 13.250 0.012 20

REGION = OKL5 CROP YEAR = 1966
 STAGE RUNS FROM DAY 74 TO DAY 122
 LATITUDE = 35.510 STD DEV = 0.400
 LONGITUDE = 97.211 STD DEV = 0.640
 ELEVATION = 292.242 STD DEV = 34.972

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 108.000 22.250 5.160 7.290 4.570 13.250 0.017 21

REGION = OKL6 CROP YEAR = 1966
 STAGE RUNS FROM DAY 105 TO DAY 124
 LATITUDE = 35.387 STD DEV = 0.437
 LONGITUDE = 95.297 STD DEV = 0.317
 ELEVATION = 214.335 STD DEV = 23.447

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 114.500 22.460 5.330 9.770 4.080 13.492 0.022 22

REGION = OKL7 CROP YEAR = 1966
 STAGE RUNS FROM DAY 91 TO DAY 114
 LATITUDE = 34.673 STD DEV = 0.293
 LONGITUDE = 98.927 STD DEV = 0.600
 ELEVATION = 415.504 STD DEV = 73.477

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 110.000 24.150 5.070 7.730 4.770 13.914 0.009 23

REGION = OKL8 CROP YEAR = 1966
 STAGE RUNS FROM DAY 105 TO DAY 122
 LATITUDE = 34.353 STD DEV = 0.217
 LONGITUDE = 97.113 STD DEV = 0.841
 ELEVATION = 266.247 STD DEV = 62.437

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 113.500 23.190 4.970 10.600 4.210 13.406 0.010 24

REGION = OKL9 CROP YEAR = 1966
 STAGE RUNS FROM DAY 95 TO DAY 125
 LATITUDE = 34.533 STD DEV = 0.567
 LONGITUDE = 94.800 STD DEV = 0.277
 ELEVATION = 141.884 STD DEV = 25.787

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
 110.000 23.870 3.720 9.130 5.340 13.250 0.024 25

REGION = CLO2 CROP YEAR = 1974
 STAGE RUNS FROM DAY 125 TO DAY 146
 LATITUDE = 40.416 STD DEV = 0.580
 LONGITUDE = 104.700 STD DEV = 1.001
 ELEVATION = 1419.234 STD DEV = 213.360

REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

135.500	25.700	3.330	7.800	3.480	14.493	0.042	26
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REGION = C166 CROP YEAR = 1974
 STAGE RUNS FROM DAY 120 TO DAY 142
 LATITUDE = 39.183 STD DEV = 0.500
 LONGITUDE = 103.700 STD DEV = 1.000
 ELEVATION = 1693.773 STD DEV = 213.360

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
131.000	22.400	4.160	2.700	3.610	14.264	0.038	27

REGION = C167 CROP YEAR = 1974
 STAGE RUNS FROM DAY 120 TO DAY 138
 LATITUDE = 37.633 STD DEV = 0.500
 LONGITUDE = 104.617 STD DEV = 1.000
 ELEVATION = 1551.432 STD DEV = 213.360

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
128.500	26.400	3.820	6.900	2.850	14.977	0.035	28

REGION = BKL1 CROP YEAR = 1969
 STAGE RUNS FROM DAY 104 TO DAY 128
 LATITUDE = 36.800 STD DEV = 0.400
 LONGITUDE = 100.517 STD DEV = 1.000
 ELEVATION = 152.000 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
116.500	21.400	5.090	6.600	4.360	13.617	0.021	29

REGION = BKL2 CROP YEAR = 1969
 STAGE RUNS FROM DAY 96 TO DAY 127
 LATITUDE = 35.717 STD DEV = 0.500
 LONGITUDE = 97.400 STD DEV = 1.000
 ELEVATION = 326.136 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
111.500	22.500	3.320	7.200	4.400	13.421	0.024	30

REGION = BKL3 CROP YEAR = 1969
 STAGE RUNS FROM DAY 100 TO DAY 126
 LATITUDE = 35.633 STD DEV = 0.400
 LONGITUDE = 95.793 STD DEV = 1.000
 ELEVATION = 208.176 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	
113.000	22.500	4.220	9.900	3.700	13.452	0.020	31

REGION = BKL4 CROP YEAR = 1969
 STAGE RUNS FROM DAY 99 TO DAY 125
 LATITUDE = 35.517 STD DEV = 0.400
 LONGITUDE = 95.797 STD DEV = 1.000

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REGION = OKL2 CROP YEAR = 1969
 STAGE RUNS FROM DAY 96 TO DAY 127
 LATITUDE = 35.717 STD DEV = 0.400
 LONGITUDE = 97.400 STD DEV = 1.000
 ELEVATION = 326.136 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
111.500	22.500	3.320	7.200	4.400	13.451	0.024

REGION = OKL3 CROP YEAR = 1969
 STAGE RUNS FROM DAY 100 TO DAY 126
 LATITUDE = 36.433 STD DEV = 0.400
 LONGITUDE = 95.693 STD DEV = 1.000
 ELEVATION = 239.178 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
111.000	22.500	4.220	7.900	3.700	13.412	0.020

REGION = OKL4 CROP YEAR = 1969
 STAGE RUNS FROM DAY 111 TO DAY 122
 LATITUDE = 35.517 STD DEV = 0.400
 LONGITUDE = 98.067 STD DEV = 1.000
 ELEVATION = 440.729 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
111.500	23.000	3.010	9.200	3.640	13.300	0.018

REGION = OKL5 CROP YEAR = 1969
 STAGE RUNS FROM DAY 102 TO DAY 125
 LATITUDE = 35.500 STD DEV = 0.400
 LONGITUDE = 96.500 STD DEV = 1.000
 ELEVATION = 265.176 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
111.500	21.600	3.340	10.600	3.670	13.243	0.020

REGION = OKL6 CROP YEAR = 1969
 STAGE RUNS FROM DAY 97 TO DAY 125
 LATITUDE = 35.300 STD DEV = 0.400
 LONGITUDE = 95.333 STD DEV = 1.000
 ELEVATION = 163.068 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
111.000	22.700	4.090	10.300	3.110	13.357	0.018

REGION = OKL7 CROP YEAR = 1969
 STAGE RUNS FROM DAY 96 TO DAY 117
 LATITUDE = 34.733 STD DEV = 0.400
 LONGITUDE = 94.733 STD DEV = 1.000
 ELEVATION = 507.492 STD DEV = 152.400

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 ORIGINAL PAGE IS POOR

106.500 24.100 3.530 9.700 4.460 13.193 0.016 35

REGION = OKLS
STAGE RUNS FROM DAY 97 TO DAY 124
LATITUDE = 34.300 STD DEV = 0.400
LONGITUDE = 77.017 STD DEV = 1.000
ELEVATION = 220.980 STD DEV = 152.400

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
110.500 24.900 3.390 12.400 3.060 13.305 0.017 36

REGION = KNS1
STAGE RUNS FROM DAY 138 TO DAY 147
LATITUDE = 32.393 STD DEV = 0.400
LONGITUDE = 101.067 STD DEV = 1.000
ELEVATION = 735.216 STD DEV = 152.400

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
143.500 27.000 7.040 12.200 3.400 14.604 0.041 37

REGION = KNS2
STAGE RUNS FROM DAY 122 TO DAY 141
LATITUDE = 35.600 STD DEV = 0.400
LONGITUDE = 103.617 STD DEV = 1.000
ELEVATION = 169.289 STD DEV = 152.400

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
131.500 27.520 3.160 10.000 5.120 14.235 0.030 38

REGION = KNS3
STAGE RUNS FROM DAY 101 TO DAY 133
LATITUDE = 37.483 STD DEV = 0.400
LONGITUDE = 102.233 STD DEV = 1.000
ELEVATION = 447.273 STD DEV = 152.400

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
127.000 25.400 4.880 8.100 3.640 14.021 0.027 39

REGION = KNS4
STAGE RUNS FROM DAY 111 TO DAY 139
LATITUDE = 37.650 STD DEV = 0.400
LONGITUDE = 98.243 STD DEV = 1.000
ELEVATION = 421.530 STD DEV = 152.400

DAY TMAX STD DEV TMIN STD DEV DAYLTH STD DEV
125.000 26.390 4.970 10.200 5.390 14.072 0.028 40

REGION = KNS5
STAGE RUNS FROM DAY 100 TO DAY 127
LATITUDE = 37.650 STD DEV = 0.400
LONGITUDE = 98.117 STD DEV = 1.000
ELEVATION = 450.417 STD DEV = 152.400

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REGION = KNS3 CROP YEAR = 1964
 STAGE RUNS FROM DAY 101 TO DAY 133
 LATITUDE = 37.493 STD DEV = 0.400
 LONGITUDE = 102.331 STD DEV = 1.000
 ELEVATION = 447.273 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
127.000	25.800	4.980	8.100	3.640	14.621	0.027

REGION = KNS4 CROP YEAR = 1964
 STAGE RUNS FROM DAY 111 TO DAY 129
 LATITUDE = 37.450 STD DEV = 0.400
 LONGITUDE = 98.083 STD DEV = 1.000
 ELEVATION = 421.538 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
125.000	26.300	4.990	10.200	5.390	14.072	0.028

REGION = KNS6 CROP YEAR = 1964
 STAGE RUNS FROM DAY 100 TO DAY 129
 LATITUDE = 37.650 STD DEV = 0.400
 LONGITUDE = 98.117 STD DEV = 1.000
 ELEVATION = 450.419 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
117.500	26.200	3.610	11.700	5.120	13.717	0.023

REGION = KNS7 CROP YEAR = 1964
 STAGE RUNS FROM DAY 116 TO DAY 136
 LATITUDE = 37.717 STD DEV = 0.400
 LONGITUDE = 96.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
120.000	23.400	4.480	11.000	5.230	14.144	0.028

REGION = KNS8 CROP YEAR = 1964
 STAGE RUNS FROM DAY 111 TO DAY 134
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 95.167 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
122.500	23.600	3.960	11.800	4.210	13.752	0.026

REGION = KNS9 CROP YEAR = 1964
 STAGE RUNS FROM DAY 111 TO DAY 130
 LATITUDE = 37.533 STD DEV = 0.400
 LONGITUDE = 95.300 STD DEV = 1.000
 ELEVATION = 281.940 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV
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REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

PARAMETER ESTIMATES FOR JOINT HEAD

ITERATION	H(1/11)	H(2/12)	H(3/13)	H(4/14)	H(5/15)	H(6/16)	H(7/17)	H(8/18)	H(9/19)	H(10/20)
0	-3.000000	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.0	0.0	0.0
1	-14.038612	0.552417	-0.195713	5.647351	-0.275629	0.152069	-0.002674	0.0	0.0	0.0
2	-13.171115	0.467793	-0.162600	4.952487	-0.231103	0.101486	-0.00426	0.0	0.0	0.0
3	-11.729412	0.395590	-0.157560	4.379027	-0.202215	0.067240	0.000720	0.0	0.0	0.0
4	-11.071525	0.386432	-0.164913	4.281102	-0.197332	0.065136	0.001107	0.0	0.0	0.0

COEFFICIENT MATRIX FOR PARAMETERS

0.23730 03	-0.37766 03	-0.13790 04	-0.28640 04	0.12150 03	-0.12050 02	-0.57630 02
-0.92760 03	0.51230 02	0.44490 02	0.10610 03	-0.79100 01	0.10420 02	-0.23360 01
-0.13700 04	0.36490 02	0.24060 03	-0.15970 03	0.16500 02	-0.23500 02	-0.75150 01
-0.28040 04	0.10410 03	-0.15770 03	0.17330 04	-0.63150 02	-0.16720 02	0.70370 01
0.17140 01	-0.90100 01	0.15560 02	-0.63150 02	0.44340 01	-0.41570 01	-0.28450 00
-0.12000 02	0.10420 02	-0.23500 02	-0.16720 02	-0.41970 01	0.11070 02	0.22170 01
0.57630 02	-0.23360 01	-0.75150 01	0.70370 01	-0.28450 00	0.22170 01	0.29620 00

COVARIANCE MATRIX FOR PARAMETERS

0.36700 01	-0.15430 01	-0.21330 00	-0.43350 00	0.18790 01	-0.18640 02	0.49110 02
-0.15430 01	0.72270 02	0.51230 02	0.16400 01	-0.13920 02	0.16120 02	-0.26150 03
-0.21330 00	0.51230 02	0.72270 02	-0.24700 01	0.25510 02	-0.36140 02	-0.11620 02
-0.43350 00	0.16400 01	-0.24700 01	0.26800 00	-0.37650 02	-0.25250 02	-0.10880 02
0.18790 01	-0.13920 02	0.25510 02	-0.37650 02	0.68610 03	-0.24530 03	-0.44000 04
-0.18640 02	0.16120 02	-0.36140 02	-0.25250 02	-0.64930 03	0.17130 02	0.34240 05
0.49110 02	-0.26150 03	-0.11620 02	0.10880 02	-0.44000 04	0.34240 05	0.45990 04

CORRELATION MATRIX

1.000000	-0.724804	-0.577150	-0.437104	0.174454	-0.623516	0.687384
-0.724804	1.000000	0.310615	0.355248	-0.597683	0.437638	-0.603125
-0.577150	0.310615	1.000000	-0.247377	0.504733	-0.455255	-0.800148
-0.437104	0.355248	-0.247377	1.000000	-0.720182	-0.120667	0.318605
0.174454	-0.597683	0.504733	-0.720182	1.000000	-0.517046	-0.248217
-0.623516	0.437638	-0.455255	-0.120667	-0.517046	1.000000	0.012242
0.687384	-0.603125	-0.800148	0.318605	-0.248217	0.012242	1.000000

ORIGINAL PAGE IS
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RESULTING RATE PREDICTIONS

	DAY	MAX	MIN	DAYLb	PRECIP	RES. RATE (AVERAGE)	CONF. RATE (95% CONFIDENCE)
1	124.5	26.560	13.640	14.333	2.110	0.0225000	0.0417260
2	124.5	26.870	9.900	14.020	4.110	0.0500000	0.0500000
3	124.5	27.280	15.040	14.140	4.960	0.0625000	0.0625000
4	119.5	26.710	8.070	13.780	2.170	0.0312500	0.0400000
5	119.5	26.660	10.420	12.780	1.010	0.0500000	0.0500000
6	119.5	26.450	12.200	12.550	2.430	0.0454444	0.0679997

CORRELATION MATRIX

1.0000	0.704454	0.577100	0.437194	0.374454	0.023516	0.687384
-0.704454	1.000000	0.311615	0.155748	-0.597683	0.437637	-0.700125
-0.577100	0.311615	1.000000	0.247377	0.504733	-0.455255	-0.390140
-0.437194	0.155748	0.247377	1.000000	-0.720182	-0.120007	-0.210000
-0.374454	0.597683	0.504733	0.720182	1.000000	-0.517147	-0.248217
-0.023516	0.437637	-0.455255	-0.120007	-0.517147	1.000000	0.012242
0.687384	-0.700125	-0.390140	-0.210000	-0.248217	0.012242	1.000000

RESULTING RATE PREDICTIONS

	RAY	TRAX	TRIN	RAYLB	PRECIP	QES. RATE (AVERAGE)	COMPL. RATE (PREDICTED)
1	132.5	26.560	13.640	14.333	2.110	0.00250000	0.00100000
2	124.5	24.870	9.900	14.020	4.110	0.00250000	0.00100000
3	125.5	27.340	15.040	14.140	0.950	0.00250000	0.00100000
4	117.5	25.710	8.070	13.782	2.170	0.00250000	0.00100000
5	117.5	26.000	10.920	13.789	1.010	0.00250000	0.00100000
6	150.5	26.450	12.500	17.936	2.930	0.00250000	0.00100000
7	124.5	26.520	11.860	16.577	3.460	0.00250000	0.00100000
8	165.5	25.730	11.370	15.633	3.320	0.00250000	0.00100000
9	171.0	25.990	10.700	15.685	2.930	0.00250000	0.00100000
10	169.0	22.460	10.610	15.667	2.930	0.00250000	0.00100000
11	135.0	25.170	10.130	14.413	6.700	0.00250000	0.00100000
12	123.5	27.510	12.370	14.413	2.610	0.00250000	0.00100000
13	136.0	25.170	10.130	14.413	2.610	0.00250000	0.00100000
14	130.5	27.530	12.370	14.273	3.510	0.00250000	0.00100000
15	122.0	21.860	12.440	13.237	1.400	0.00250000	0.00100000
16	123.5	20.700	4.910	14.326	1.400	0.00250000	0.00100000
17	111.0	22.430	4.250	13.428	0.400	0.00250000	0.00100000
18	106.5	21.480	3.280	13.254	1.830	0.00250000	0.00100000
19	111.0	21.100	7.970	13.495	4.680	0.00250000	0.00100000
20	101.0	22.350	6.340	11.268	1.580	0.00250000	0.00100000
21	101.0	22.350	7.230	11.268	1.580	0.00250000	0.00100000
22	114.5	22.460	7.770	13.472	1.580	0.00250000	0.00100000
23	102.5	24.100	7.730	13.014	2.620	0.00250000	0.00100000
24	113.5	23.170	10.600	13.406	8.750	0.00250000	0.00100000
25	119.5	23.120	9.130	13.298	7.630	0.00250000	0.00100000
26	135.5	25.550	7.800	14.493	0.130	0.00250000	0.00100000
27	131.0	22.500	2.700	14.264	0.250	0.00250000	0.00100000
28	123.5	23.400	6.700	14.077	0.460	0.00250000	0.00100000
29	118.0	23.400	6.600	13.617	4.570	0.00250000	0.00100000
30	111.5	22.500	9.200	13.451	3.810	0.00250000	0.00100000
31	113.5	22.500	9.200	13.492	2.530	0.00250000	0.00100000
32	110.5	23.000	9.200	11.359	2.720	0.00250000	0.00100000
33	113.5	23.600	10.600	11.463	3.560	0.00250000	0.00100000
34	111.0	22.900	10.100	11.367	4.060	0.00250000	0.00100000
35	106.5	24.100	9.100	11.183	0.510	0.00250000	0.00100000
36	113.5	24.000	12.400	13.305	7.370	0.00250000	0.00100000
37	143.5	27.000	12.200	14.604	2.940	0.00250000	0.00100000
38	131.5	27.500	10.000	14.215	0.760	0.00250000	0.00100000
39	127.0	25.500	8.100	14.021	0.000	0.00250000	0.00100000
40	125.0	26.300	10.200	14.092	0.760	0.00250000	0.00100000
41	117.5	26.200	11.700	13.717	0.510	0.00250000	0.00100000
42	126.0	23.400	11.000	14.144	4.060	0.00250000	0.00100000
43	122.5	23.600	11.800	13.952	4.830	0.00250000	0.00100000
44	120.5	25.500	13.100	13.815	2.540	0.00250000	0.00100000

REFERENCE VARIANCE = 0.154640-03

DEGREES OF FREEDOM = 37.

APPENDIX C

Generalized Least Squares Program

The program estimates function parameters using the least squares method of simultaneous adjustment of observations and parameters. Functional forms may be varied by changing the FORTRAN arithmetic statement in the EF FUNCTION subprogram. Specific terms within the function selected may be included or deleted through the use of the IPAR parameter selection variable input in the main program. The typical output shown is for a polynomial function utilizing only constant, linear T_x , linear D_L , and interaction $T_x D_L$ terms for stage 4-5 (soft dough-ripe).

ORIGINAL PAGE IS
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DATA SET GENLSQ1 AT LEVEL TMP AS OF 01/14/78
 LEAST SQUARES FUNCTION GENERATOR FOR
 WINTER WHEAT CROP CALENDAR MODEL

THE PROGRAM ESTIMATES PARAMETERS OF A FUNCTION USING THE LEAST
 SQUARES METHOD OF SIMULTANEOUS ADJUSTMENT OF OBSERVATIONS
 AND PARAMETERS. THE
 DEPENDENT VARIABLE IS DAILY GROWTH RATE WITHIN EACH PHENOLOGICAL
 STAGE FOR WINTER WHEAT. THE INDEPENDENT VARIABLES ARE DAILY OR
 AVERAGE VALUES OF MAXIMUM TEMPERATURE, MINIMUM TEMPERATURE,
 DAY LENGTH, AND PRECIPITATION

THE PROGRAM HAS THE CAPABILITY THAT ANY FORM OF FUNCTION MAY BE
 ASSUMED. TO CHANGE FUNCTION FORM, SIMPLY CHANGE THE FUNCTION GIVEN
 IN THE FF SUBPROGRAM WHICH FOLLOWS THE MAIN, AND CHANGE THE FIRST FOUR
 DATA CARDS.

DIMENSION, DATA, EQUIVALENCE, TYPE BLOCK

0001 IMPLICIT REAL*8(A-H,O-Z)
 0002 DOUBLE PRECISION EN(20,20)
 0003 DIMENSION X(20),J2(20),I2(20),ISTGNM(4),H(20),G(7),DH(20),DG(7)
 0004 DIMENSION DAY(500),TMAX(500),TMIN(500),DAYLTH(500)
 0005 DIMENSION PRECIP(500),B(20),T(20),DELH(20),A(7),V(7)
 0006 DIMENSION R(500),S(20),IEQNAM(80),IPAR(20)
 0007 COMMON H
 0008 EQUIVALENCE (G(1),SR),(G(2),STX),(G(3),STM),(G(4),SDL),(G(5),SPR)
 0009 EQUIVALENCE (G(6),ELAT),(G(7),ELEV)
 0010 EQUIVALENCE (H(14),RATE),(H(17),TX),(H(18),TM),(H(19),DL)
 0011 EQUIVALENCE (H(20),PR)
 0012 DATA DH/5*.0001,2*.000001,3*.0001,4*.00001,6*.0001/

THE FIRST FOUR (THERE MUST BE EXACTLY FOUR) DATA CARDS ARE THE
 FORTRAN EXPRESSION FOR THE FUNCTION SELECTED, READ IN A FORMAT.

0013 READ(1,99)(IEQNAM(I),I=1,80)
 0014 99 FORMAT(20A4)

BEGIN LOOP FOR REGRESSION
 (SEPARATE REGRESSION FOR EACH PHENOLOGICAL STAGE)

0015 DO 2222 Istage=1,5

FOR EACH STAGE INTERVAL, A STAGE 'HEADER' CARD IS READ WITH THE FOLL

IBGSTG = STAGE NUMBER AT BEGINNING OF INTERVAL
 NDSTGE = STAGE NUMBER AT END OF INTERVAL
 WHERE

0 = PLANTING
 1 = EMERGENCE
 2 = JOINTING
 3 = HEADING
 4 = SOFT DOUGH
 5 = RIPE

THESE ARE ENTERED AS INTEGERS, RIGHT ADJUSTED IN THE FIRST TWO
 FIVE COLUMN FIELDS

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C      ISTGNM = ALPHANUMERIC NAME OF THE INTERVAL, CORRESPONDING TO THE STA
C      NUMBERS ABOVE (EXAMPLE... JOINTING-HEADING). ENTERED IN ALPHANU
C      IN COLUMNS 16-31.
C      LOCYRS = NUMBER OF LOCATION YEARS OF DATA TO FOLLOW, ENTERED AS AN
C      INTEGER RIGHT ADJUSTED IN COLUMNS 32-35.
C      NVARBL = NUMBER OF INDEPENDENT VARIABLES CHOSEN (POSSIBILITIES ARE
C      TMAX, TMIN, DAYLTH, PRECIP, LATITUDE, ELEVATION), IN COL 36-40
C      NOBS = NUMBER OF OBSERVED QUANTITIES FOR EACH EQUATION (WILL
C      ORDINARILY WILL BE 4 OR 5, USUALLY SELECTING RATE, TMAX, TMIN,
C      DAYLTH, AND SELECTING PRECIP FOR SOME RUNS)
C      AND SELECTING PRECIP FOR SOME RUNS)
C      NPAR = NUMBER OF PARAMETERS WILL USUALLY BE 15, THE MAXIMUM
C      NUMBER OF PARAMETERS POSSIBLE FOR THE POLYNOMIAL OR EXPONENTIAL
C      SRT=STD. DEV. OF GROWTH RATE FOR STAGE, IN COL. 51-60
C      IPAR= PARAMETER SELECTION INDEX, 0 IF TO BE DELETED,
C      1 IF TO BE INCLUDED, IN COL 66-80
C      THE COMPUTED VALUE OF NPARAM IS THE RESULTING NUMBER OF
C      PARAMETERS (TERMS) IN THE EQUATION, BASED UPON IPAR
0016      READ(1,100) IBSGSG, NDSTGE, (ISTGNM(I), I=1,4), LOCYRS, NVARBL, NOBS,
0017      100      IPAR, SRT, (IPAR(I), I=1, NPAR)
0018      FORMAT(2I5, 5X, 4A4, I4, 3I5, F10.0, 5X, I5I1)
0019      NPARAM=0
0020      DO 231 I=1, NPAR
0021      IF (IPAR(I).NE.0) NPARAM=NPARAM+1
0022      231 CONTINUE
0023      NOBS=0
0024      DO 243 I=1, 5
0025      IF (IPAR(I).NE.0) NOBS=NOBS+1
0026      243 CONTINUE
0027      WRITE(3,101) IBSGSG, NDSTGE, (ISTGNM(I), I=1,4)
0028      101 FORMAT(1H1, ///, 5X, 'REGRESSION FOR WINTER WHEAT FROM STAGE', I2, ' TO
0029      1 STAGE', I2, ' ', 4A4, ///)
0030      WRITE(3,102) LOCYRS
0031      102 FORMAT(5X, 'NUMBER OF LOCATION-YEARS =', I5, ///)
0032      WRITE(3,103) NVARBL, NOBS
0033      103 FORMAT(5X, 'NUMBER OF VARIABLES CHOSEN (TMAX, TMIN, DAYLTH, PRECIP, LAT
0034      ITUDE, ELEV) =', I5, /, 5X, 'NUMBER OF OBSERVED QUANTITIES PER EQUATION
0035      2 =', I5)
0036      WRITE(3,126) NPAR
0037      126 FORMAT(///, 5X, 'MAXIMUM NUMBER OF H PARAMETERS POSSIBLE =', I5)
0038      WRITE(3,232) NPARAM
0039      232 FORMAT(5X, 'NUMBER OF H PARAMETERS (TERMS) SELECTED =', I5)
0040      WRITE(3,98)
0041      98 FORMAT(5X, 'FOR EQUATION OF THE FORM', ///)
0042      WRITE(3,97) (IEQNAM(I), I=1,80)
0043      97 FORMAT(5X, 20A4)
C      INITIALIZE PARAMETERS

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0040	READ(1,223)(H(I),I=1,NPAR)	00112
0041	223 FORMAT(8E10.0)	00113
	C	00114
	C	00115
	C	00116
0042	RATE=0.	00117
0043	SR=0.	00118
0044	STX=0.	00119
0045	STM=0.	00120
0046	SBL=0.	00121
0047	S-R=0.	00122
0048	IPT=0	00123
0049	DO 1111 LOCYR=1,LOCYRS	00124
	C	00125
	C	00126
	C	00127
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	C	00150
	C	00151
	C	00152
0050	READ(1,104) LOCIDN,IYEAR,IDAYBG,IDAYND,ELAT,ELONG,ELEV,SLAT,SLONG	00153
	1,SELEV	00154
0051	104 FORMAT(1X,A4,3I5,6F10.0)	00155
0052	IF(1STAGE.EQ.2)READ(11,348) IORMCY, IGRNUP	00156
0053	348 FORMAT(2I10)	00157
0054	WRITE(3,105) LOCIDN,IYEAR	00158
0055	105 FORMAT(///,10X,'REGION =',A4,10X,'CROP YEAR =',I5)	00159
0056	WRITE(3,106) IDAYBG,IDAYND	00160
0057	106 FORMAT(10X,'STAGE RUNS FROM DAY',I5,' TO DAY',I5)	00161
0058	WRITE(3,107) ELAT,SLAT	00162
0059	107 FORMAT(10X,'LATITUDE =',F10.3,10X,'STD DEV =',F10.3)	00163
0060	WRITE(3,108) ELONG,SLONG	00164
0061	108 FORMAT(10X,'LONGITUDE =',F10.3,10X,'STD DEV =',F10.3)	00165
0062	WRITE(3,109) ELEV,SELEV	00166
0063	109 FORMAT(10X,'ELEVATION =',F10.3,10X,'STD DEV =',F10.3)	00167
0064	WRITE(3,110)	00168

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0065 110 FORMAT(//,7X,'DAY',6X,'TMAX',3X,'STD DEV',6X,'TMIN',3X,'STD DEV',400169
1X,'DAYLTH',3X,'STD DEV',4X,'PRECIP',3X,'STD DEV'//) 00170**3
0066 DO 11 DAY=1,500 00171
0067 IPT=IPT+1 00172
00173
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FOR EACH LOCATION YEAR, FROM ONE TO 500 DATA POINTS MAY BE ENTERED
CONTAINING METEOROLOGICAL DATA. USUALLY, AVERAGE MET VALUES WILL BE
USED, SO THERE WILL ONLY BE ONE CARD. HOWEVER, THE PROGRAM CAN ACCEPT
DAILY VALUES AS WELL. FOR THE EMERGE-JOINT INTERVAL, MONTHLY AVERAGE
MET DATA CAN BE USED.

IPT = POINT NUMBER, THE INDEX USED

DAY = JULIAN DAY NUMBER. WILL BE THE ACTUAL DAY NUMBER IF DAILY
MET DATA ARE USED, OR THE MEDIAN DAY NUMBER FOR THE INTERVAL IF
AVERAGE MET DATA ARE USED. COL 1-10

TMAX = MAXIMUM TEMPERATURE, COL 11-20

TMIN = MINIMUM TEMPERATURE, COL 21-30

PRECIP = PRECIPITATION, COL 31-40

STMAX = STANDARD DEVIATION OF TMAX, COL 41-50

STMIN = STANDARD DEVIATION OF TMIN, COL 51-60

SPRCP = STANDARD DEVIATION OF PRECIP, COL 61-70

IFLAG = FLAG TO CHECK IF THIS IS THE LAST MET CARD FOR THIS
LOCATION YEAR. ENTER 1 IN COL 80 IF LAST CARD, OTHERWISE LEAVE BLANK

0068 READ(11,111) DAY(IPT),TMAX(IPT),TMIN(IPT),PRECIP(IPT),
1STMAX,STMIN,SPRCP,IFLAG
0069 (IPT)=1./FLOAT(IDAYND-IDAYBG+1)
0070 STATE=ST
0071 IF(ISTATE.NE.2) GO TO 31
0072 IDAY=DAY(IPT)
0073 IGRNUP=IGRNUP+365
0074 IF(IORMCY.LT.180) IORMCY=IORMCY+365
0075 IF(IDAY.LT.150) IDAY=IDAY+365
0076 R(IPT)=0.
0077 IF(IDAY.LT.IORMCY) R(IPT)=0.5/FLOAT(IORMCY-IDAYBG)
0078 IF(IDAY.GT.IGRNUP) R(IPT)=0.5/FLOAT(IDAYND-IGRNUP)
0079 111 FORMAT(7F10.0,I10)

SET UP VARIANCE DEFAULT VALUES AND COMPUTE DAY LENGTH

31 IF(STMAX.LT.1.E-15) STMAX=5.
IF(STMIN.LT.1.E-15) STMIN=5.
IF(SPRCP.LT.1.E-15.AND.PRECIP(IPT).LT.1.E-15) SPRCP=.001
IF(SPRCP.LT.1.E-15.AND.PRECIP(IPT).GT.1.E-15.AND.PRECIP(IPT).LT.
1.0) SPRCP=2.*PRECIP(IPT)
IF(SPRCP.LT.1.E-15.AND.PRECIP(IPT).GE..05.AND.PRECIP(IPT).LT..5)
1SPRCP=PRECIP(IPT)
IF(SPRCP.LT.1.E-15.AND.PRECIP(IPT).GE..5) SPRCP=0.5*PRECIP(IPT)
DAYLTH(IPT)=12.14+(3.37*DSIN(FLAT/57.29577951)/DCOS(FLAT/57.29577951)
151)*DCOS(.0172*DAY(IPT)-2.94)

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0087      SDAYL=DABS(3.370*(1./DCOS(ELAT/57.29577951))**2*DCOS(.0172*DAY(IPT
1)-2.94))**SLAT/57.29577951
0088      WRITE(3,112) DAY(IPT),TMAX(IPT),STMAX,TMIN(IPT),STMIN,DAYLTH(IPT),
1SDAYL,PRECIP(IPT),SPRCP,IPT
0089      112  FORMAT(9F10.3,110)
0090      DAYLTH(IPT)=DAYLTH(IPT)-12.
0091      RATE=RATE+R(IPT)
0092      SR=SR+R(IPT)**2
0093      STX=STMAX**2+STX
0094      STM=STM+STMIN**2+STM
0095      SDL=SDAYL**2+SDL
0096      SPR=SPRCP**2+SPR
0097      IF(FLAG.NE.0) GO TO 1111
0098      11  CONTINUE
0099      1111 CONTINUE
0100      NPT=IPT
0101      STX=DSORT(STX/NPT)
0102      STM=DSORT(STM/NPT)
0103      SDL=DSORT(SDL/NPT)
0104      SPR=DSORT(SPR/NPT)
0105      SR=DSORT(SR/NPT-(RATE/NPT)**2)
0106      RATE=RATE/NPT
0107      WRITE(3,245)
0108      245  FORMAT(//,10X,'POOLED STD DEV FOR,')
0109      WRITE(3,246)SR,STX,STM,SDL,SPR
0110      246  FORMAT(10X,'RATE=',F10.7,/,10X,'TMAX=',F10.7,/,10X,'TMIN=',
CF10.7,/,10X,'DAYL=',F10.7,/,10X,'PRCP=',F10.7)
C
C      FORM NORMAL EQUATION MATRICES
C
0111      WRITE(3,123)(ISTGM(I),I=1,4)
0112      123  FORMAT(1H1,///,10X,'PARAMETER ESTIMATES FOR ',4A4,///)
0113      WRITE(3,114)
0114      114  FORMAT(1X,'ITERATION',2X,'H(1/10)',7X,'H(2/11)',7X,'H(3/12)',7X,
C'H(4/13)',7X,'H(5/14)',7X,'H(6/15)',7X,'H(7)',10X,'H(8)',10X,
C'H(9)')
0115      WRITE(3,113)(H(I),I=1,NPAR)
0116      113  FORMAT(4X,'0',F16.6,8F14.6/2X,6F14.6)
0117      DO 22 I=1,NPAR
0118      DO 9 J=1,NPAR
0119      T(I)=0.
0120      DO 8 J=1,NPAR
0121      EN(I,J)=0.
0122      8  CONTINUE
0123      9  CONTINUE
0124      DO 21 K=1,NPT
0125      RATE=R(K)
0126      TX=TMAX(K)
0127      TM=TMIN(K)
0128      DL=DAYLTH(K)
0129      PR=PRECIP(K)
0130      ND=20
0131      E=0.
0132      DO 300 J=16,ND
0133      L=J-15
0134      A(L)=(EF(J,DH(J),ISTAGE)-EF(1,0.,ISTAGE))/DH(J)
0135      IF(IPAR(L).EQ.0)A(L)=0.
0136      300  E=(G(L)*A(L))**2+E

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0189      DO 304 I=1,5
0190      IF(IPAR(I).EQ.0) GO TO 304
0191      V(I)=G(I)**2*A(I)*CAY
0192      SS1=V(I)**2/G(I)**2+SS1
0193      304 CONTINUE
0194      SS=SS+SS1
0195      301 CONTINUE
0196      SOSQ=SS/DOCFREE
0197      DO 33 I=1,NPAR
0198      DO 32 J=1,NPAR
0199      EN(I,J)=SOSQ*EN(I,J)
0200      32 CONTINUE
0201      33 CONTINUE
0202      WRITE(3,127)
0203      127 FORMAT(///,10X,'COVARIANCE MATRIX FOR PARAMETERS',//)
0204      DO 34 I=1,NPAR
0205      34 WRITE(3,120) (EN(I,J),J=1,NPAR)
0206      DO 15 I=1,NPAR
0207      15 S(I)=DSORT(EN(I,I))
0208      DO 17 I=1,NPAR
0209      DO 27 J=1,NPAR
0210      IF(S(I).EQ.0..OR.S(J).EQ.0.) GO TO 27
0211      EN(I,J)=EN(I,J)/(S(I)*S(J))
0212      27 CONTINUE
0213      17 CONTINUE
0214      WRITE(3,122)
0215      122 FORMAT(///,10X,'CORRELATION MATRIX')
0216      DO 28 I=1,NPAR
0217      IF(IPAR(I).EQ.0) GO TO 28
0218      WRITE(3,124) (EN(I,J),J=1,NPAR)
0219      124 FORMAT(15F8.4)
0220      28 CONTINUE
C
C      OUTPUT
C
0221      WRITE(3,1115)
0222      1115 FORMAT(1H1,///,10X,'RESULTING RATE PREDICTIONS',///,14X,'DAY',13X
0223      1,'TMAX',13X,'TMIN',11X,'DAYLTH',11X,'PRECIP',8X,'OBS. RATE',
0224      27X,'COMP. RATE')
0225      WRITE(3,117)
0226      117 FORMAT(93X,'(AVERAGE)',7X,'(PREDICTED)')
0227      SMRATE=0.
0228      DO 26 I=1,NPT
0229      RATE=R(I)
0230      TX=TMAX(I)
0231      TM=TMIN(I)
0232      DL=DAYLTH(I)
0233      PR=PRECIP(I)
0234      RATE=R(I)-EF(1,0.,ISTAGE)
0235      SMRATE=SMRATE+(R(I)-RATE)**2
0236      DAYLTH(I)=DAYLTH(I)+12.
0237      IF(R(I)-R(I+1).LT.1.E-15) GO TO 30
0238      29 WRITE(3,116) I,DAY(I),TMAX(I),TMIN(I),DAYLTH(I),PRECIP(I),R(I),
0239      1,RATE
0240      GO TO 26
0241      30 WRITE(3,116) I,DAY(I),TMAX(I),TMIN(I),DAYLTH(I),PRECIP(I),R(I),

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MAINPGM

DATE 01/14/78

TIME

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0240	116	FORMAT(17,F10.1,4F17.3,2F17.7,F10.6)	00392
0241	26	CONTINUE	00393
0242		NDF=NPT-NPARAM	##5
0243		SMRATE=SMRATE/NDF	##5
0244		WRITE(3,248) SMRATE,NDF	##5
0245	248	FORMAT(//,10X,'VARIANCE ABOUT REGRESSION= ',D12.5,/,10X,	##5
		C'DEGREES= ',I10)	##5
0246		WRITE(3,119) SOSQ	00394
0247	119	FORMAT(///,5X,'REFERENCE VARIANCE = ',E15.5)	00395
0248		WRITE(3,125) DCFREE	00396
0249	125	FORMAT(///,5X,'DEGREES OF FREEDOM = ',F10.0)	00397
0250		GO TO 2222	00398
0251	1	WRITE(3,119)	00399
0252	116	FORMAT(////,20X,'*** NORMAL EQUATION MATRIX IS ILL CONDITIONED ***	00400
		1',///)	00401
0253	2222	CONTINUE	00402
0254		CALL EXIT	00403
0255		END	00404

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0001	DCUBLE PRECISION FUNCTION EF(JH,DH,I)	00405
0002	IMPLICIT REAL*8(A-H,O-Z)	00406
0003	DIMENSION H(20),G(7)	00407
0004	COMMON H	00408
0005	EQUIVALENCE (H(15),RATE),(H(17),TX),(H(18),TM),(H(19),DL)	00409
0006	EQUIVALENCE (H(20),PR)	00410
0007	H(JH)=H(JH)+DH	00411
0008	2 EF = RATE - (H(1)+H(2)*TX+H(3)*TM+H(4)*DL+H(5)*PR+H(6)*TX**2	00412**4
	1+H(7)*TM**2+H(8)*DL**2+H(9)*PR**2+H(10)*TX*DL+H(11)*TM*DL+H(12)	00413
	*DL*PR+H(13)*TX*TM+H(14)*TX*PR+H(15)*TM*PR)	00414**4
0009	3 H(JH)=H(JH)-DH	00415
0010	RETURN	00416
0011	END	00417

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0001	SUBROUTINE MATINV(A,N,M)	00418
0002	DOUBLE PRECISION A(M,M)	00419
0003	KS=0	00420
0004	DO 1 K=1,N	00421
0005	IF(DABS(A(K,K)).LT.1.D-16) GO TO 1	00422
0006	KS=KS+1	00423
0007	DO 2 J=1,N	00424
0008	2 IF(J.NE.K) A(K,J)=A(K,J)/A(K,K)	00425
0009	A(K,K)=1./A(K,K)	00426
0010	DO 1 I=1,N	00427
0011	IF(I.EQ.K) GO TO 1	00428
0012	DO 3 J=1,N	00429
0013	3 IF(J.NE.K) A(I,J)=A(I,J)-A(I,K)*A(K,J)	00430
0014	A(I,K)=-A(I,K)*A(K,K)	00431
0015	1 CONTINUE	00432
0016	IF(KS.NE.N) PRINT 4,KS	00433
0017	4 FORMAT(//,2X,'RANK=',I4)	00434
0018	RETURN	00435
0019	END	00436

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15	145.5	28.600	12.400	14.672	3.050	0.0476190	0.0476190
15	149.0	28.700	13.400	14.358	3.050	0.0476190	0.0476190
15	146.0	26.400	13.400	14.686	3.560	0.0476190	0.0476190
15	145.5	26.600	14.400	14.580	3.050	0.0476190	0.0476190
39	140.0	28.200	15.000	14.371	3.810	0.0476190	0.0476190

VARIANCE ABOUT REGRESSION = 0.55744D-04
DEGREES = 35

REFERENCE VARIANCE = 0.24922D-04

DEGREES OF FREEDOM = 113.

REGRESSION FOR WINTER WHEAT FROM STAGE 4 TO STAGE 5, SOFT DOUGH-RIPE

NUMBER OF LOCATION-YEARS = 44

NUMBER OF VARIABLES CHOSEN (TMAX, TMIN, DAYLTH, PRECIP, LATITUDE, ELEV) = 2
NUMBER OF OBSERVED QUANTITIES PER EQUATION = 3

MAXIMUM NUMBER OF H PARAMETERS POSSIBLE = 15
NUMBER OF H PARAMETERS (TERMS) SELECTED = 4
FOR EQUATION OF THE FORM

RATE = H(1) + H(2) * TX + H(3) * DL + H(10) * TX * DL

REGION = KNS9 CROP YEAR = 1966
STAGE RUNS FROM DAY 156 TO DAY 171
LATITUDE = 38.120 STD DEV = 0.356
LONGITUDE = 95.770 STD DEV = 0.941
ELEVATION = 343.205 STD DEV = 45.973

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
163.500	29.520	2.750	15.820	3.040	14.769	0.032	3.910	2.440

REGION = KNS8 CROP YEAR = 1966
STAGE RUNS FROM DAY 152 TO DAY 167
LATITUDE = 37.680 STD DEV = 0.421
LONGITUDE = 98.270 STD DEV = 0.915
ELEVATION = 503.346 STD DEV = 114.156

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
159.500	31.270	3.260	16.640	3.240	14.693	0.039	2.890	9.300

REGION = KNS7 CROP YEAR = 1966
STAGE RUNS FROM DAY 158 TO DAY 172
LATITUDE = 37.562 STD DEV = 0.396
LONGITUDE = 100.626 STD DEV = 0.751
ELEVATION = 812.353 STD DEV = 157.496

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165.000 30.760 3.690 14.870 3.370 14.718 0.037 2.360 5.890 3

REGION = KNS6 CROP YEAR = 1966
 STAGE RUNS FROM DAY 164 TO DAY 176
 LATITUDE = 39.612 STD DEV = 0.372
 LONGITUDE = 95.760 STD DEV = 0.954
 ELEVATION = 329.194 STD DEV = 41.422

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.000	29.720	2.930	15.870	3.050	14.831	0.036	2.120	8.190

REGION = KNS5 CROP YEAR = 1966
 STAGE RUNS FROM DAY 159 TO DAY 173
 LATITUDE = 38.650 STD DEV = 0.267
 LONGITUDE = 98.152 STD DEV = 1.073
 ELEVATION = 486.765 STD DEV = 121.184

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
166.000	29.530	4.460	15.160	3.660	14.825	0.026	2.850	9.980

REGION = KNS3 CROP YEAR = 1966
 STAGE RUNS FROM DAY 163 TO DAY 178
 LATITUDE = 39.502 STD DEV = 0.303
 LONGITUDE = 95.864 STD DEV = 0.726
 ELEVATION = 338.328 STD DEV = 9.679

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.500	28.970	2.520	16.900	3.340	14.918	0.030	6.100	20.000

REGION = KNS1 CROP YEAR = 1965
 STAGE RUNS FROM DAY 170 TO DAY 180
 LATITUDE = 39.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.973
 ELEVATION = 868.375 STD DEV = 190.258

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
175.000	33.710	2.120	17.890	2.420	14.913	0.021	3.280	11.470

REGION = KNS3 CROP YEAR = 1965
 STAGE RUNS FROM DAY 181 TO DAY 180
 LATITUDE = 39.502 STD DEV = 0.303
 LONGITUDE = 95.854 STD DEV = 0.726
 ELEVATION = 338.328 STD DEV = 9.679

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.500	28.110	2.450	16.820	2.520	14.918	0.030	6.380	12.800

REGION = KNS4 CROP YEAR = 1965
 STAGE RUNS FROM DAY 166 TO DAY 181
 LATITUDE = 38.684 STD DEV = 0.252
 LONGITUDE = 100.784 STD DEV = 0.940
 ELEVATION = 769.315 STD DEV = 337.100

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REGION = KNS1 CROP YEAR = 1966
 STAGE RUNS FROM DAY 170 TO DAY 180
 LATITUDE = 39.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.973
 ELEVATION = 868.375 STD DEV = 190.258

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
175.000	33.710	2.120	17.890	2.420	14.913	0.021	3.280	..470

REGION = KNS3 CROP YEAR = 1965
 STAGE RUNS FROM DAY 161 TO DAY 180
 LATITUDE = 39.102 STD DEV = 0.303
 LONGITUDE = 95.864 STD DEV = 0.726
 ELEVATION = 338.328 STD DEV = 9.679

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.500	28.110	2.450	16.820	2.520	14.918	0.030	6.380	12.800

REGION = KNS4 CROP YEAR = 1965
 STAGE RUNS FROM DAY 166 TO DAY 181
 LATITUDE = 38.684 STD DEV = 0.252
 LONGITUDE = 100.784 STD DEV = 0.940
 ELEVATION = 769.315 STD DEV = 337.100

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
173.500	29.340	3.970	16.000	1.780	14.836	0.024	6.130	11.220

REGION = KNS5 CROP YEAR = 1965
 STAGE RUNS FROM DAY 162 TO DAY 174
 LATITUDE = 38.650 STD DEV = 0.267
 LONGITUDE = 98.152 STD DEV = 1.073
 ELEVATION = 486.765 STD DEV = 121.184

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
168.000	28.730	3.180	16.500	2.100	14.832	0.026	3.830	10.230

REGION = KNS6 CROP YEAR = 1965
 STAGE RUNS FROM DAY 160 TO DAY 175
 LATITUDE = 38.612 STD DEV = 0.372
 LONGITUDE = 95.760 STD DEV = 0.954
 ELEVATION = 329.184 STD DEV = 41.429

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
167.500	28.140	2.960	16.960	2.560	14.827	0.036	4.650	11.520

REGION = KNS7 CROP YEAR = 1965
 STAGE RUNS FROM DAY 158 TO DAY 174
 LATITUDE = 37.562 STD DEV = 0.396
 LONGITUDE = 100.626 STD DEV = 0.751
 ELEVATION = 812.353 STD DEV = 157.496

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
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REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

166.000 28.810 3.700 16.260 1.390 14.722 0.037 3.820 7.930 12

REGION = KNSB CROP YEAR = 1965
STAGE RUNS FROM DAY 155 TO DAY 169
LATITUDE = 37.680 STD DEV = 0.421
LONGITUDE = 98.270 STD DEV = 0.915
ELEVATION = 503.346 STD DEV = 114.156

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
162.000	27.780	2.120	15.720	1.980	14.712	0.039	10.180	20.860

REGION = KNS4 CROP YEAR = 1966
STAGE RUNS FROM DAY 168 TO DAY 174
LATITUDE = 36.684 STD DEV = 0.252
LONGITUDE = 100.784 STD DEV = 0.940
ELEVATION = 769.315 STD DEV = 337.100

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
171.000	29.940	4.680	15.480	3.290	14.838	0.024	2.570	7.210

REGION = KNS1 CROP YEAR = 1965
STAGE RUNS FROM DAY 174 TO DAY 185
LATITUDE = 39.520 STD DEV = 0.211
LONGITUDE = 100.722 STD DEV = 0.973
ELEVATION = 868.375 STD DEV = 170.258

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
179.500	29.660	2.540	16.240	1.930	14.890	0.021	5.000	8.430

REGION = KNS1 CROP YEAR = 1965
STAGE RUNS FROM DAY 174 TO DAY 185
LATITUDE = 39.520 STD DEV = 0.211
LONGITUDE = 100.722 STD DEV = 0.973
ELEVATION = 868.375 STD DEV = 190.258

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
179.500	29.660	2.540	16.240	1.930	14.890	0.021	5.000	8.430

REGION = KNS2 CROP YEAR = 1965
STAGE RUNS FROM DAY 164 TO DAY 176
LATITUDE = 39.500 STD DEV = 0.296
LONGITUDE = 98.338 STD DEV = 0.924
ELEVATION = 500.725 STD DEV = 116.982

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.000	28.830	3.130	16.020	2.980	14.918	0.029	1.880	4.350

REGION = KNS2 CROP YEAR = 1966
STAGE RUNS FROM DAY 156 TO DAY 174
LATITUDE = 39.500 STD DEV = 0.296
LONGITUDE = 98.338 STD DEV = 0.924
ELEVATION = 500.725 STD DEV = 116.782

ORIGINAL PAGE IS
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REGION = KNS1 CROP YEAR = 1265
 STAGE RUNS FROM DAY 174 TO DAY 195
 LATITUDE = 37.520 STD DEV = 0.211
 LONGITUDE = 100.722 STD DEV = 0.973
 ELEVATION = 868.375 STD DEV = 190.258

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
179.500	29.660	2.540	16.240	1.930	14.890	0.021	5.000	8.430	16

REGION = KNS2 CROP YEAR = 1265
 STAGE RUNS FROM DAY 164 TO DAY 176
 LATITUDE = 37.500 STD DEV = 0.296
 LONGITUDE = 98.318 STD DEV = 0.924
 ELEVATION = 500.725 STD DEV = 116.982

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
170.000	28.830	3.130	16.020	2.580	14.918	0.029	1.880	4.350	17

REGION = KNS2 CROP YEAR = 1266
 STAGE RUNS FROM DAY 156 TO DAY 174
 LATITUDE = 37.500 STD DEV = 0.296
 LONGITUDE = 98.318 STD DEV = 0.924
 ELEVATION = 500.725 STD DEV = 116.982

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
165.000	29.320	4.060	15.350	3.950	14.904	0.029	2.730	7.130	18

REGION = KNS3 CROP YEAR = 1265
 STAGE RUNS FROM DAY 153 TO DAY 167
 LATITUDE = 38.190 STD DEV = 0.656
 LONGITUDE = 95.770 STD DEV = 0.941
 ELEVATION = 343.205 STD DEV = 45.973

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
160.000	28.610	2.280	17.420	1.870	14.744	0.061	9.160	17.730	19

REGION = CLO6 CROP YEAR = 1972
 STAGE RUNS FROM DAY 167 TO DAY 196
 LATITUDE = 39.410 STD DEV = 0.475
 LONGITUDE = 103.338 STD DEV = 0.922
 ELEVATION = 1444.323 STD DEV = 326.738

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
181.500	28.200	4.810	12.060	2.670	14.863	0.046	2.600	7.200	20

REGION = KNS1 CROP YEAR = 1264
 STAGE RUNS FROM DAY 170 TO DAY 181
 LATITUDE = 39.383 STD DEV = 0.500
 LONGITUDE = 101.067 STD DEV = 1.000
 ELEVATION = 966.216 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
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REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

175.500 32.500 4.000 13.400 3.100 14.878 0.049 0.0 0.250 21

REGION = KNS2 CROP YEAR = 1964
 STAGE RUNS FROM DAY 161 TO DAY 175
 LATITUDE = 38.600 STD DEV = 0.400
 LONGITUDE = 100.617 STD DEV = 1.000
 ELEVATION = 859.289 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
168.000	31.100	4.120	11.700	5.130	14.827	0.038	2.030	4.830	22

REGION = KNS3 CROP YEAR = 1964
 STAGE RUNS FROM DAY 157 TO DAY 171
 LATITUDE = 37.483 STD DEV = 0.400
 LONGITUDE = 100.833 STD DEV = 1.000
 ELEVATION = 887.273 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
164.000	28.700	4.180	11.300	3.610	14.706	0.037	3.560	12.450	23

REGION = KNS4 CROP YEAR = 1964
 STAGE RUNS FROM DAY 154 TO DAY 172
 LATITUDE = 39.450 STD DEV = 0.400
 LONGITUDE = 98.083 STD DEV = 1.000
 ELEVATION = 421.538 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
163.000	29.900	3.900	12.000	4.680	14.887	0.039	0.510	1.780	24

REGION = KNS5 CROP YEAR = 1964
 STAGE RUNS FROM DAY 149 TO DAY 161
 LATITUDE = 37.650 STD DEV = 0.400
 LONGITUDE = 98.117 STD DEV = 1.000
 ELEVATION = 458.419 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
155.000	29.500	4.660	13.800	5.080	14.643	0.036	1.780	4.320	25

REGION = KNS7 CROP YEAR = 1964
 STAGE RUNS FROM DAY 156 TO DAY 175
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 96.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
165.500	28.600	3.950	17.500	2.950	14.927	0.040	12.700	22.350	26

REGION = KNSH CROP YEAR = 1964
 STAGE RUNS FROM DAY 157 TO DAY 170
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 96.167 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

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REGION = KNS6 CROP YEAR = 1964
 STAGE RUNS FROM DAY 149 TO DAY 161
 LATITUDE = 37.650 STD DEV = 0.400
 LONGITUDE = 98.117 STD DEV = 1.000
 ELEVATION = 458.419 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
155.000	29.500	4.660	13.800	5.000	14.643	0.036	1.780	4.320

REGION = KNS7 CROP YEAR = 1964
 STAGE RUNS FROM DAY 156 TO DAY 175
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 96.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
165.500	28.600	3.250	17.500	2.950	14.927	0.040	12.700	22.350

REGION = KNS8 CROP YEAR = 1964
 STAGE RUNS FROM DAY 157 TO DAY 170
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 96.167 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
163.500	29.600	2.440	18.900	3.180	14.811	0.033	4.320	9.650

REGION = KNS9 CROP YEAR = 1964
 STAGE RUNS FROM DAY 150 TO DAY 164
 LATITUDE = 37.533 STD DEV = 0.400
 LONGITUDE = 95.800 STD DEV = 1.000
 ELEVATION = 281.240 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
157.000	27.300	5.160	15.400	4.500	14.655	0.036	5.080	9.140

REGION = KNS2 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 182
 LATITUDE = 38.600 STD DEV = 0.400
 LONGITUDE = 100.617 STD DEV = 1.000
 ELEVATION = 869.289 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
172.500	28.600	5.680	12.700	3.910	14.829	0.039	2.290	5.590

REGION = KNS3 CROP YEAR = 1969
 STAGE RUNS FROM DAY 158 TO DAY 177
 LATITUDE = 37.483 STD DEV = 0.400
 LONGITUDE = 100.833 STD DEV = 1.000
 ELEVATION = 887.273 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
177.500	28.100	4.900	13.400	2.910	14.720	0.037	3.560	10.220

REGION = KNS4 CROP YEAR = 1969
 STAGE RUNS FROM DAY 159 TO DAY 180
 LATITUDE = 39.450 STD DEV = 0.400
 LONGITUDE = 98.083 STD DEV = 1.000
 ELEVATION = 421.538 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
169.500	28.300	5.370	13.900	2.280	14.912	0.039	2.790	6.100

REGION = KNS5 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 178
 LATITUDE = 38.600 STD DEV = 0.400
 LONGITUDE = 97.950 STD DEV = 1.000
 ELEVATION = 454.761 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
170.500	28.600	5.990	13.400	3.260	14.830	0.039	5.080	10.670

REGION = KNS6 CROP YEAR = 1969
 STAGE RUNS FROM DAY 166 TO DAY 171
 LATITUDE = 37.650 STD DEV = 0.400
 LONGITUDE = 95.117 STD DEV = 1.000
 ELEVATION = 458.419 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
163.500	29.000	5.020	14.300	2.290	14.719	0.037	3.560	5.590

REGION = KNS7 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 191
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 96.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
177.000	29.300	4.710	17.100	4.860	14.924	0.040	6.860	13.210

REGION = KNS8 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 181
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 96.167 STD DEV = 1.000
 ELEVATION = 353.563 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
172.000	27.100	4.390	15.500	4.280	14.833	0.039	11.180	18.290

REGION = KNS9 CROP YEAR = 1969
 STAGE RUNS FROM DAY 155 TO DAY 171
 LATITUDE = 37.533 STD DEV = 0.400
 LONGITUDE = 95.800 STD DEV = 1.000
 ELEVATION = 281.940 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
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REGION = KNS0 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 191
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 96.113 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
177.000	29.300	4.710	17.100	4.860	14.924	0.040	6.860	13.210	34

REGION = KNS0 CROP YEAR = 1969
 STAGE RUNS FROM DAY 163 TO DAY 181
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 95.167 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
172.000	27.100	4.390	15.500	4.280	14.833	0.039	11.180	18.290	35

REGION = KNS0 CROP YEAR = 1969
 STAGE RUNS FROM DAY 155 TO DAY 171
 LATITUDE = 37.533 STD DEV = 0.400
 LONGITUDE = 95.800 STD DEV = 1.000
 ELEVATION = 281.940 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
163.000	27.100	3.220	14.800	2.760	14.705	0.037	5.080	9.650	36

REGION = KNS1 CROP YEAR = 1974
 STAGE RUNS FROM DAY 160 TO DAY 177
 LATITUDE = 37.383 STD DEV = 0.500
 LONGITUDE = 101.067 STD DEV = 1.000
 ELEVATION = 966.216 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
172.500	31.900	5.450	14.200	1.890	14.905	0.049	0.0	0.250	37

REGION = KNS2 CROP YEAR = 1974
 STAGE RUNS FROM DAY 159 TO DAY 175
 LATITUDE = 38.600 STD DEV = 0.400
 LONGITUDE = 100.617 STD DEV = 1.000
 ELEVATION = 869.289 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
167.000	33.600	6.280	13.200	3.910	14.824	0.038	3.300	8.820	38

REGION = KNS3 CROP YEAR = 1974
 STAGE RUNS FROM DAY 152 TO DAY 169
 LATITUDE = 37.433 STD DEV = 0.400
 LONGITUDE = 100.813 STD DEV = 1.000
 ELEVATION = 887.273 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
160.500	29.700	4.870	13.200	3.200	14.683	0.037	2.290	5.840	39

REGION = KNS4 CROP YEAR = 1974
 STAGE RUNS FROM DAY 163 TO DAY 173
 LATITUDE = 39.450 STD DEV = 0.400
 LONGITUDE = 99.083 STD DEV = 1.000
 ELEVATION = 421.538 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
168.000	33.100	5.920	16.100	5.470	14.910	0.039	1.020	1.520	40

REGION = KNS5 CROP YEAR = 1974
 STAGE RUNS FROM DAY 159 TO DAY 170
 LATITUDE = 39.600 STD DEV = 0.400
 LONGITUDE = 97.950 STD DEV = 1.000
 ELEVATION = 454.761 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
154.500	27.300	4.480	12.800	3.160	14.814	0.038	3.810	6.860	41

REGION = KNS6 CROP YEAR = 1974
 STAGE RUNS FROM DAY 158 TO DAY 156
 LATITUDE = 37.450 STD DEV = 0.400
 LONGITUDE = 98.117 STD DEV = 1.000
 ELEVATION = 458.419 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
161.000	29.300	3.250	14.400	2.990	14.702	0.037	8.130	17.020	42

REGION = KNS7 CROP YEAR = 1974
 STAGE RUNS FROM DAY 161 TO DAY 174
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 99.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
167.500	30.200	4.410	15.700	5.270	14.935	0.040	0.760	1.520	43

REGION = KNS8 CROP YEAR = 1974
 STAGE RUNS FROM DAY 160 TO DAY 172
 LATITUDE = 38.533 STD DEV = 0.400
 LONGITUDE = 96.157 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	
166.000	29.500	4.450	15.900	4.860	14.824	0.038	3.300	8.380	44

PRINTED STD DEV FOR:
 TMAX = 0.014400
 TMIN = 0.014400
 TMIN = 0.014400
 TMIN = 0.014400
 TMIN = 0.014400
 TMIN = 0.014400

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STAGE RUNS FROM DAY 161 TO DAY 174
 LATITUDE = 39.717 STD DEV = 0.400
 LONGITUDE = 96.133 STD DEV = 1.000
 ELEVATION = 385.877 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
167.500	30.200	4.410	15.700	5.270	14.935	0.040	0.760	1.520

REGION = KNSB CROP YEAR = 1974
 STAGE RUNS FROM DAY 160 TO DAY 172
 LATITUDE = 38.633 STD DEV = 0.400
 LONGITUDE = 96.167 STD DEV = 1.000
 ELEVATION = 353.568 STD DEV = 152.400

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV
166.000	29.500	4.450	15.900	4.860	14.824	0.038	3.300	8.380

PIELED STD DEV FOR:
 RATE = 0.0184235
 TMAX = 4.1633023
 TMIN = 3.3970161
 DAYL = 0.0375914
 PRCP = 10.6231976

REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

PARAMETER ESTIMATES FOR SOFT DOUGH-RIPE

ITERATION	H(1/10)	H(2/11)	H(3/12)	H(4/13)	H(5/14)	H(6/15)	H(7)	H(8)	H(9)
0	-3.030000 0.0	0.001000 0.0	0.0 0.0	0.001000 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
1	0.26024190 01 0.3158740-01	-0.851860-01 0.0	0.0 0.0	-0.939770 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
2	0.18884690 01 0.2333370-01	-0.621200-01 0.0	0.0 0.0	-0.684210 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
3	0.20231540 01 0.2457830-01	-0.663810-01 0.0	0.0 0.0	-0.733010 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
4	0.19729540 01 0.2452260-01	-0.654090-01 0.0	0.0 0.0	-0.722140 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
5	0.19793180 01 0.2460200-01	-0.656130-01 0.0	0.0 0.0	-0.724440 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
6	0.19777500 01 0.2458620-01	-0.655690-01 0.0	0.0 0.0	-0.723950 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
7	0.19782420 01 0.2456960-01	-0.655780-01 0.0	0.0 0.0	-0.724050 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0
RANK= 4									
8	0.19781790 01 0.2458870-01	-0.655740-01 0.0	0.0 0.0	-0.724030 00 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0

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COFACTOR MATRIX FOR PARAMETERS

0.53370 01 0.0	-0.13330 00 0.0	0.0 0.0	0.0 0.0	-0.19150 01 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.65160-01
-0.18330 00 0.0	0.62560-02 0.0	0.0 0.0	0.0 0.0	0.65160-01 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	-0.22230-02
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
-0.19150 01 0.0	0.65160-01 0.0	0.0 0.0	0.0 0.0	0.68160 00 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	-0.23160-01
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.65160-01 0.0	-0.22230-02 0.0	0.0 0.0	0.0 0.0	-0.23160-01 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.79030-03
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

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RESULTING RATE PREDICTIONS

DAY	TMAX	TMIN	DAYLTH	PRECIP	DRS. RATE (AVERAGE)	COMP. RATE (PREDICTED)
1	163.5	28.520	15.820	14.769	3.910	0.0625000
2	159.5	31.270	16.640	14.693	2.890	0.0625000
3	165.0	30.760	14.870	14.718	2.360	0.0666667
4	170.0	27.720	15.870	14.831	2.120	0.0769231
5	166.0	29.530	15.160	14.825	2.650	0.0666667
6	170.5	28.770	16.900	14.918	6.100	0.0625000
7	175.0	33.710	17.890	14.913	3.260	0.0709091
8	170.5	28.110	16.820	14.918	6.380	0.0500000
9	173.5	29.340	16.000	14.836	6.130	0.0625000
10	168.0	28.730	16.500	14.832	3.830	0.0769231
11	161.5	28.140	16.960	14.827	4.650	0.0625000
12	163.0	28.810	16.260	14.722	3.820	0.0788235
13	162.0	27.780	15.720	14.712	10.180	0.0666667
14	171.0	27.940	15.470	14.836	2.570	0.1438571
15	179.5	29.660	16.740	14.890	5.000	0.0833333
16	179.5	29.560	16.240	14.890	5.000	0.0833333
17	170.0	28.830	16.020	14.918	1.880	0.0769231
18	169.0	29.320	15.360	14.904	2.730	0.0526316
19	160.0	28.610	17.420	14.744	9.160	0.0666667
20	181.5	29.250	12.060	14.863	2.600	0.0333333
21	175.5	32.500	13.400	14.896	0.0	0.0833333
22	168.0	31.100	11.700	14.827	2.030	0.0666667
23	169.0	29.760	11.300	14.706	3.560	0.0666667
24	163.0	29.900	12.600	14.687	0.510	0.0526316
25	155.0	29.500	13.800	14.643	1.780	0.0769231
26	165.5	25.600	17.500	14.927	12.700	0.0500000
27	163.5	29.600	14.900	14.811	4.320	0.0714285
28	157.0	27.300	15.400	14.655	5.080	0.0666667
29	172.5	28.600	12.700	14.829	2.290	0.0500000
30	167.5	28.100	13.400	14.720	3.560	0.0500000
31	162.5	28.300	13.900	14.912	2.790	0.0454545
32	170.5	26.600	13.400	14.830	5.030	0.0625000
33	163.5	27.600	14.300	14.719	3.560	0.0625000
34	177.0	29.300	17.100	14.924	6.860	0.0344828
35	172.0	27.100	15.500	14.823	11.180	0.0526316
36	163.0	27.100	14.800	14.705	5.080	0.0526316
37	172.5	31.900	14.200	14.905	0.0	0.1000000
38	167.0	31.600	13.200	14.824	3.300	0.0583333
39	160.5	29.700	13.200	14.683	2.290	0.0555556
40	168.0	31.100	16.100	14.910	1.020	0.0909091
41	164.5	27.300	12.800	14.814	3.810	0.0833333
42	161.0	29.800	14.400	14.702	8.130	0.0909091
43	167.5	30.200	15.700	14.935	0.760	0.0714285
44	166.0	29.500	15.900	14.824	3.300	0.0769231

VARIANCE ABOUT REGRESSION= 0.302940-03
DEGREES= 40

REFERENCE VARIANCE = 0.512640-01

DEGREES OF FREEDOM = 128.

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APPENDIX D

Test Program

The program utilizes parameters from the least squares programs and daily environmental values not included for parameter estimation as input. The parameters are applied to the daily environmental data, and cumulative stage development and output is computed independently for each phenological interval. The typical case shown utilizes a polynomial function using linear T_x and T_m terms, as well as the interaction term $T_x T_m$.

DATA SET TESTCC

AT LEVEL 008 AS OF 12/29/77

PROGRAM TO TEST REGRESSION
FOR WINTER WHEAT CROP CALENDAR

THIS PROGRAM IS USED TO TEST THE PARAMETERS OBTAINED FOR THE
WINTER WHEAT CROP CALENDAR MODEL FROM EITHER OF THE TWO ASSOCIATED
LEAST SQUARES PROGRAMS, EITHER WITH OR WITHOUT PRECIPITATION

THE PROGRAM USES INPUTS IN THE SAME FORM AS THE LEAST SQUARES PROGRAM
BUT DAILY MET DATA IS USED TO DRIVE THE MODEL

IMPLICIT REAL *8(A-H,O-Z)
DIMENSION H(5,20),ISTGNM(5),IEQNAM(80)

THE FIRST FOUR (THERE MUST BE EXACTLY FOUR) DATA CARDS ARE THE
FORTRAN EXPRESSION FOR THE FUNCTION SELECTED, READ IN A FORMAT.

READ(1,95) (IEQNAM(I), I=1,80)
95 FORMAT(20A4)

THE NEXT SET OF DATA CARDS CONTAINS THE PARAMETERS OBTAINED FROM
THE LEAST SQUARES PROGRAMS. THE DATA ARE IN FIVE 2-CARD SETS,
EACH CONTAINING THE PARAMETERS FOR THE SUCCEEDING PHENOLOGICAL
INTERVALS. FOR EACH INTERVAL, 15 PARAMETERS ARE READ, IN 8F10.0 FORMAT.
THERE MUST BE 10 CARDS READ. IF A PARAMETER IS NOT INCLUDED FOR
A PARTICULAR CASE, ITS POSITION IN THE DATA CARD MAY BE LEFT BLANK,
OR A ZERO MAY BE ENTERED.

DO 10 I=1,5
READ(1,99) (H(I,J), J=1,15)
99 FORMAT(8F10.0/8F10.0)
10 CONTINUE
DO 2222 I=1,5

FOR EACH STAGE INTERVAL, A STAGE 'HEADER' CARD IS READ WITH THE FOLLOWING

IBGSG = STAGE NUMBER AT BEGINNING OF INTERVAL
NDSTGE = STAGE NUMBER AT END OF INTERVAL
WHERE

0 = PLANTING
1 = EMERGENCE
2 = JOINTING
3 = HEADING
4 = SOFT DOUGH
5 = RIPE

THESE ARE ENTERED AS INTEGERS, RIGHT ADJUSTED IN THE FIRST TWO
FIVE COLUMN FIELDS

ISTGNM = ALPHANUMERIC NAME OF THE INTERVAL, CORRESPONDING TO THE STAGE
NUMBERS ABOVE (EXAMPLE... JOINTING-HEADING). ENTERED IN ALPHANUMERIC
IN COLUMNS 16-35.

LOCYRS = NUMBER OF LOCATION YEARS OF DATA TO FOLLOW, ENTERED AS AN
INTEGER RIGHT ADJUSTED IN COLUMNS 36-40.

NVARBL = NUMBER OF INDEPENDENT VARIABLES CHOSEN (POSSIBILITIES ARE

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C      TMAX, TMIN, DAYLTH, PRECIP, LATITUDE, ELEVATION), IN COL 41-45      C0058**5
C      NOBS = NUMBER OF OBSERVED QUANTITIES FOR EACH EQUATION ( WILL      C0059
C      ORDINARILY BE 1, MEANING ONE RATE IS ASSUMED OBSERVED FOR EACH      C0060**6
C      DATA POINT), IN COL 46-50      C0061
C      NPARG = NUMBER OF PARAMETERS SELECTED FOR THE FIT, IN COL 51-55      C0062**5
C      NPARG = NUMBER OF PARAMETERS SELECTED FOR THE FIT, IN COL 51-55      C0063
C      NPARG = NUMBER OF PARAMETERS SELECTED FOR THE FIT, IN COL 51-55      C0064**6
C      NPARG = NUMBER OF PARAMETERS SELECTED FOR THE FIT, IN COL 51-55      C0065
0010      READ(1,100) IBGSTG,NDSTGE,(ISTGNM(J),J=1,5),LOCYRS,NVARBL,NOBS,      C0066**6
      1NPARG      C0067
0011      100 FORMAT(2I5,5X,5A4,4I5)      C0068**5
0012      WRITE(3,101) IBGSTG,NDSTGE,(ISTGNM(J),J=1,5)      C0069**6
0013      101 FORMAT(1H1,///,5X,'TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT'      C0070**4
      1, STAGE=,13,' TO STAGE=,13,' ,',5A4)      C0071**5
0014      WRITE(3,96)      C0072**5
0015      96 FORMAT(///,5X,'EQUATION IS OF THE FORM')      C0073**5
0016      WRITE(3,97)(IEQNAM(K),K=1,80)      C0074**6
0017      97 FORMAT(5X,20A4)      C0075**5
0018      WRITE(3,102) H(1,1)      C0076**5
0019      102 FORMAT(///,10X,'CONSTANT TERM FOR EQUATION =',F10.6)      C0077**6
0020      WRITE(3,103) H(1,2)      C0078**5
0021      103 FORMAT(10X,'COEFFICIENT FOR TMAX TERM =',F10.6)      C0079**6
0022      WRITE(3,104) H(1,3)      C0080**5
0023      104 FORMAT(10X,'COEFFICIENT FOR TMIN TERM =',F10.6)      C0081**6
0024      WRITE(3,105) H(1,4)      C0082**5
0025      105 FORMAT(10X,'COEFFICIENT FOR DAYLTH TERM=',F10.6)      C0083**6
0026      WRITE(3,106) H(1,5)      C0084**5
0027      106 FORMAT(10X,'COEFFICIENT FOR PRECIP TERM=',F10.6)      C0085**6
0028      WRITE(3,107) H(1,6)      C0086**5
0029      107 FORMAT(10X,'COEFFICIENT TMAX**2 TERM =',F11.6)      C0087**6
0030      WRITE(3,108) H(1,7)      C0088**5
0031      108 FORMAT(10X,'COEFFICIENT TMIN**2 TERM =',F11.6)      C0089**6
0032      WRITE(3,109) H(1,8)      C0090**5
0033      109 FORMAT(10X,'COEFFICIENT DAYLTH**2 TERM=',F11.6)      C0091**6
0034      WRITE(3,110) H(1,9)      C0092**5
0035      110 FORMAT(10X,'COEFFICIENT PRECIP**2 TERM=',F11.6)      C0093**6
0036      WRITE(3,111) H(1,10)      C0094**5
0037      111 FORMAT(10X,'COEFFICIENT TMAX*DAYLTH =',F12.6)      C0095**6
0038      WRITE(3,112) H(1,11)      C0096**5
0039      112 FORMAT(10X,'COEFFICIENT TMIN*DAYLTH =',F12.6)      C0097**6
0040      WRITE(3,113) H(1,12)      C0098**5
0041      113 FORMAT(10X,'COEFFICIENT DAYLTH*PRECIP =',F10.6)      C0099**6
0042      WRITE(3,114) H(1,13)      C0100**5
0043      114 FORMAT(10X,'COEFFICIENT TMAX*TMIN =',F14.6)      C0101**6
0044      WRITE(3,115) H(1,14)      C0102**5
0045      115 FORMAT(10X,'COEFFICIENT TMAX*PRECIP =',F12.6)      C0103**6
0046      WRITE(3,116) H(1,15)      C0104**5
0047      116 FORMAT(10X,'COEFFICIENT TMIN*PRECIP =',F12.6)      C0105**6
0048      DO 1111 LOCYR=1,LOCYRS      C0106**6
      C0107
C      FOR EACH LOCATION YEAR OF DATA USED, A 'HEADER' IS READ WITH THE FCL      C0108**2
C      LOCIDN = LOCATION IDENTIFICATION, IN ALPHANUMERIC IN COL 2-5,      C0109
C      CONSISTING OF A 3 LETTER CODE FOR THE STATE, FOLLOWED BY THE CROD NU      C0110**6
C      (EXAMPLE... CLO7 = COLORADO, CRD 7)      C0111
C      IYEAR = THE CROP YEAR, COL 6-10      C0112**6
C      C0113
C      C0114**6
C      C0115

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C	IDAYBG = JULIAN DAY NUMBER AT WHICH THIS PHENOLOGICAL INTERVAL	00116**6
C	BEGAN FOR THAT LOCATION YEAR, COL 11-15	00117
C		00118
C	IDAYND = JULIAN DAY NUMBER AT WHICH THIS PHENOLOGICAL INTERVAL	00119**6
C	ENDED FOR THIS LOCATION YEAR, COL 16-20	00120
C		00121
C	ELAT = LATITUDE OF THE CRD, EITHER THE LATITUDE OF A MET STATION	00122**6
C	NEAR THE CENTER, OR THE AVERAGE OF SEVERAL THROUGHOUT THE CRD,	00123
C	COL 21-30	00124
C		00125
C	ELONG = LONGITUDE OF THE CRD, COL 31-40	00126**6
C		00127
C	ELEV = ELEVATION OF THE CRD, COL 41-50	00128**6
C		00129
C	SLAT = STANDARD DEVIATION OF THE LATITUDE, COL 51-60	00130**6
C		00131
C	SLONG = STANDARD DEVIATION OF THE LONGITUDE, COL 61-70	00132**6
C		00133
C	SELEV = STANDARD DEVIATION OF THE ELEVATION, COL 71-80	00134**6
C		00135
0049	READ(1,117) LOCIDN,IYEAR,IDAYBG,IDAYND,ELAT,ELONG,ELEV,SLAT,SLONG,	00136**5
	1SELEV	00137
0050	117 FORMAT(1X,A4,3I5,6F10.0)	00138**5
0051	WRITE(3,118) LOCIDN,IYEAR	00139**5
0052	118 FORMAT(11X,10X,'REGION =',A4,10X,'CROP YEAR =',I5)	00140**6
0053	WRITE(3,119) IDAYBG,IDAYND	00141**5
0054	119 FORMAT(10X,'STAGE RUNS FROM DAY',I5,' TO DAY',I5)	00142**5
0055	WRITE(3,120) ELAT,SLAT	00143**5
0056	120 FORMAT(10X,'LATITUDE =',F10.3,10X,'STD DEV =',F10.3)	00144**6
0057	WRITE(3,121) ELONG,SLONG	00145**5
0058	121 FORMAT(10X,'LONGITUDE =',F10.3,10X,'STD DEV =',F10.3)	00146**6
0059	WRITE(3,122) ELEV,SELEV	00147**5
0060	122 FORMAT(10X,'ELEVATION =',F10.3,10X,'STD DEV =',F10.3)	00148**6
0061	WRITE(3,123)	00149**5
0062	123 FORMAT(11X,7X,'DAY',6X,'TMAX',3X,'STD DEV',6X,'TMIN',3X,'STD DEV',	00150**4
	14X,'DAYLTH',3X,'STD DEV',4X,'PRECIP',3X,'STD DEV',6X,'RATE',5X,	00151**2
	2'STAGE',11)	00152**5
0063	SMRATE=1-1	00153**6
0064	DO 11 J=1,1000	00154**6
C		00155
C	FOR EACH LOCATION YEAR, FROM ONE TO 1000 DATA POINTS MAY BE ENTERED	00156
C	CONTAINING METEOROLOGICAL DATA. USUALLY, AVERAGE MET VALUES WILL BE	00157
C	USED, SO THERE WILL ONLY BE ONE CARD. HOWEVER, THE PROGRAM CAN ACCEPT	00158
C	DAILY VALUES AS WELL. FOR THE EMERGE-JOINT INTERVAL, MONTHLY AVERAGE	00159
C	MET DATA CAN BE USED.	00160
C		00161
C	IPT = POINT NUMBER, THE INDEX USED	00162**6
C		00163
C	DAY = JULIAN DAY NUMBER. WILL BE THE ACTUAL DAY NUMBER IF DAILY	00164**6
C	MET DATA ARE USED, OR THE MEDIAN DAY NUMBER FOR THE INTERVAL IF	00165
C	AVERAGE MET DATA ARE USED. COL 1-10	00166
C		00167
C	TMAX = MAXIMUM TEMPERATURE, COL 11-20	00168**6
C		00169
C	TMIN = MINIMUM TEMPERATURE, COL 21-30	00170**6
C		00171
C	PRECIP = PRECIPITATION, COL 31-40	00172**6
C		00173

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C	STMAX = STANDARD DEVIATION OF TMAX, COL 41-50	00174**6
C		00175
C	STMIN = STANDARD DEVIATION OF TMIN, COL 51-60	00176**6
C		00177
C	SPRCP = STANDARD DEVIATION OF PRECIP, COL 61-70	00178**6
C		00179
C	IFLAG = FLAG TO CHECK IF THIS IS THE LAST MET CARD FOR THIS	00180**6
C	LOCATION YEAR. ENTER 1 IN COL 80 IF LAST CARD, OTHERWISE LEAVE BLA	00181
C		00182
0065	READ(1,124) DAY,TX,TM,PR,STX,STM,SPR,IFLAG	00183**5
0066	124 FORMAT(7F10.0,110)	00184**5
0067	DL=12.14+(3.37*DSIN(ELAT/57.29577951)/DCOS(ELAT/57.29577951)	00185**6
	1*DCOS(.0172*DAY-2.94))	00186**5
0068	DL=DL-12.	00187**6
0069	SDL=DABS(3.37*(1./DCCS(ELAT/57.29577951))*2*DCOS(.0172*DAY-2.94))	00188**6
0070	1*SLAT/57.29577951	00189
	RATE= (H(I,1)+H(I,2)*TX+H(I,3)*TM+H(I,4)*DL+H(I,5)*PR	00190**8
	1+H(I,6)*TX**2+H(I,7)*TM**2+H(I,8)*DL**2+H(I,9)*PR**2	00191**5
	2+H(I,10)*TX*DL+H(I,11)*TM*DL+H(I,12)*DL*PR	00192**5
	3+H(I,13)*TX*TM+H(I,14)*TX*PR+H(I,15)*TM*PR)	00193**7
0071	SMRATE=SMRATE+RATE	00194**6
0072	DL=DL+12.	00195**6
0073	WRITE(3,125) DAY,TX,STX,TM,STM,DL,SDL,PR,SPR,RATE,SMRATE	00196**5
0074	125 FORMAT(F10.1,4(F10.3,F10.5),2F10.6)	00197**5
0075	IF(IFLAG.NE.0) GO TO 1111	00198**5
0076	11 CONTINUE	00199
0077	1111 CONTINUE	00200
0078	2222 CONTINUE	00201
0079	CALL EXIT	00202
0080	END	00203

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 0 TO STAGE 1, PLANT-EMERGE

EQUATION IS OF THE FORM

$$RATE = H(1) + H(2) * TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TM * DL + H(7) * TX * TM$$

CONSTANT TERM FOR EQUATION = 0.059028
 COEFFICIENT FOR TMAX TERM = 0.000637
 COEFFICIENT FOR TMIN TERM = -0.0009475
 COEFFICIENT FOR DAYLTH TERM = 0.0
 COEFFICIENT FOR PRECIP TERM = 0.0
 COEFFICIENT TMAX**2 TERM = 0.0
 COEFFICIENT TMIN**2 TERM = 0.0
 COEFFICIENT DAYLTH**2 TERM = 0.0
 COEFFICIENT PRECIP**2 TERM = 0.0
 COEFFICIENT TMAX*DAYLTH = 0.0
 COEFFICIENT TMIN*DAYLTH = 0.0
 COEFFICIENT DAYLTH*PRECIP = 0.0
 COEFFICIENT TMAX*TMIN = 0.000403
 COEFFICIENT TMAX*PRECIP = 0.0
 COEFFICIENT TMIN*PRECIP = 0.0

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REGION = OKL1 CRCP YEAR = 1964
 STAGE RUNS FROM DAY 262 TO DAY 275
 LATITUDE = 36.621 STD DEV = 0.237
 LONGITUDE = 100.988 STD DEV = 1.297
 ELEVATION = 0.903 STD DEV = 0.287

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
262.0	32.700	0.83000	8.910	1.63000	12.151	0.00010	0.0	0.0	0.112728	0.112728
263.0	30.500	1.83000	12.800	2.83000	12.108	0.00028	1.270	2.29000	0.114346	0.277073
264.0	21.100	6.13000	9.400	1.46000	12.065	0.00065	1.210	2.54000	0.061249	0.290322
265.0	27.200	1.46000	11.100	2.95000	12.022	0.00102	3.300	6.60000	0.072728	0.383050
266.0	28.700	1.61000	15.000	1.75000	11.979	0.00139	0.0	0.0	0.107834	0.492885
267.0	26.600	0.55000	11.100	2.09000	11.936	0.00176	0.0	0.0	0.089565	0.502549
268.0	26.600	2.54000	11.700	1.05000	11.893	0.00213	0.250	0.51000	0.090405	0.672955
269.0	27.800	1.06000	12.800	3.98000	11.850	0.00250	0.0	0.0	0.093712	0.771667
270.0	25.400	1.94000	13.300	4.67000	11.807	0.00287	0.0	0.0	0.085790	0.857457
271.0	19.700	1.89000	5.000	0.78000	11.765	0.00324	0.0	0.0	0.061731	0.917188
272.0	25.000	1.66000	3.900	1.01000	11.722	0.00361	0.0	0.0	0.077245	0.796433
273.0	28.700	0.53000	6.700	2.41000	11.680	0.00398	0.0	0.0	0.071901	1.088334
274.0	26.600	2.53000	11.100	3.40000	11.637	0.00434	0.0	0.0	0.089665	1.177929
275.0	31.100	1.40000	15.500	2.58000	11.595	0.00471	0.0	0.0	0.126045	1.304044

REGION = OKL9 CRCP YEAR = 1971
 STAGE RUNS FROM DAY 280 TO DAY 292
 LATITUDE = 34.577 STD DEV = 0.411
 LONGITUDE = 94.997 STD DEV = 0.401
 ELEVATION = 0.209 STD DEV = 0.060

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
280.0	24.400	1.62000	18.300	1.32000	11.442	0.01071	4.320	9.14000	0.080243	0.080243
281.0	23.300	1.32000	9.400	2.06000	11.404	0.01130	15.240	32.00000	0.072776	0.151219
282.0	16.600	2.93000	3.900	1.42000	11.366	0.01188	29.210	15.24000	0.058707	0.212626
283.0	17.800	1.81000	0.600	1.12000	11.329	0.01245	0.250	0.25000	0.068374	0.281600
284.0	16.600	0.63000	7.200	0.99000	11.291	0.01303	0.0	0.0	0.042495	0.331025
285.0	17.200	0.72000	11.700	0.82000	11.254	0.01360	25.650	13.46000	0.040140	0.371235
286.0	18.700	0.84000	13.900	0.82000	11.218	0.01416	3.810	3.05000	0.045126	0.416361
287.0	19.400	2.11000	9.400	0.91000	11.181	0.01472	0.0	0.0	0.055732	0.472074
288.0	18.300	1.96000	8.300	2.64000	11.145	0.01528	0.0	0.0	0.053187	0.525281
289.0	17.800	0.78000	3.900	0.61000	11.109	0.01583	0.0	0.0	0.061356	0.586636
290.0	15.000	2.05000	5.000	1.38000	11.073	0.01638	0.0	0.0	0.051397	0.638033
291.0	19.600	0.60000	6.100	1.42000	11.038	0.01692	0.250	0.25000	0.061725	0.697758

262.0	32.700	0.81000	8.910	1.63000	12.151	0.00010	0.0	0.0	0.117728	0.117728
263.0	30.500	1.81000	12.800	2.83000	12.108	0.00028	1.270	2.29000	0.114346	0.227073
264.0	21.100	6.13000	7.400	1.46000	12.065	0.00065	1.270	2.54000	0.064249	0.290322
265.0	27.200	1.45000	11.100	2.95000	12.022	0.00102	3.300	6.60000	0.092728	0.383050
266.0	29.700	1.61000	15.000	1.75000	11.979	0.00139	0.0	0.0	0.103834	0.492885
267.0	26.600	0.55000	11.100	2.09000	11.936	0.00176	0.0	0.0	0.089565	0.502549
268.0	26.600	2.54000	11.700	1.05000	11.893	0.00213	0.250	0.51000	0.090405	0.672955
269.0	27.800	1.05000	12.800	3.98000	11.850	0.00250	0.0	0.0	0.09712	0.771667
270.0	25.500	1.94000	13.300	4.67000	11.807	0.00287	0.0	0.0	0.085190	0.857457
271.0	19.700	1.81000	5.000	0.78000	11.765	0.00324	0.0	0.0	0.061731	0.919198
272.0	25.000	1.66000	3.900	1.01000	11.722	0.00361	0.0	0.0	0.077245	0.966433
273.0	23.900	0.51000	6.700	2.41000	11.680	0.00398	0.0	0.0	0.091901	1.088334
274.0	26.600	2.53000	11.100	3.40000	11.637	0.00434	0.0	0.0	0.089665	1.177999
275.0	31.100	1.40000	15.500	2.58000	11.595	0.00471	0.0	0.0	0.126045	1.304044

REGION = BKL9 CROP YEAR = 1971
 STAGE RUNS FROM DAY 280 TO DAY 292
 LATITUDE = 34.577 STC DEV = 0.411
 LONGITUDE = 94.997 STC DEV = 0.401
 ELEVATION = 0.209 STC DEV = 0.060

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
280.0	24.400	1.62000	18.300	1.39000	11.442	0.01071	4.320	9.14000	0.080743	0.080943
281.0	23.100	1.73000	9.400	2.06000	11.404	0.01130	15.240	32.00000	0.072976	0.151919
282.0	16.600	2.91000	3.900	1.42000	11.366	0.01188	29.210	15.24000	0.058707	0.212626
283.0	17.800	1.81000	0.600	1.52000	11.329	0.01245	0.250	0.25000	0.068774	0.281600
284.0	15.500	0.61000	7.200	0.99000	11.291	0.01303	0.0	0.0	0.049495	0.331095
285.0	17.200	0.72000	11.700	0.82000	11.254	0.01360	25.650	13.46000	0.040140	0.371235
286.0	18.700	0.84000	13.900	0.82000	11.218	0.01416	3.810	3.05000	0.045126	0.416361
287.0	12.400	2.11000	7.400	0.91000	11.181	0.01472	0.0	0.0	0.055732	0.472094
288.0	16.300	1.76000	8.300	2.64000	11.145	0.01528	0.0	0.0	0.053187	0.525281
289.0	17.900	0.78000	3.900	0.61000	11.109	0.01583	0.0	0.0	0.061356	0.586636
290.0	15.000	2.05000	5.000	1.38000	11.073	0.01638	0.0	0.0	0.051397	0.638033
291.0	19.400	0.68000	6.100	1.49000	11.038	0.01692	0.250	0.25000	0.061225	0.699258
292.0	20.500	0.61000	8.300	1.23000	11.003	0.01746	0.250	0.25000	0.061940	0.761198

REGION = CLOT CROP YEAR = 1975
 STAGE RUNS FROM DAY 264 TO DAY 291
 LATITUDE = 40.483 STC DEV = 0.317
 LONGITUDE = 103.213 STC DEV = 0.867
 ELEVATION = 1259.433 STC DEV = 147.523

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
264.0	18.900	3.62000	-2.200	4.01000	12.054	0.00097	0.250	0.25000	0.075164	0.075164
265.0	23.700	2.62000	0.600	5.47000	12.004	0.00152	0.0	0.0	0.074331	0.149495
266.0	26.600	3.17000	2.200	6.65000	11.955	0.00207	0.0	0.0	0.078677	0.228172
267.0	26.100	3.37000	3.900	4.50000	11.906	0.00263	0.0	0.0	0.079673	0.307844
268.0	27.200	4.05000	1.100	5.26000	11.856	0.00318	0.0	0.0	0.077967	0.385811
269.0	27.400	5.46000	3.300	4.82000	11.807	0.00373	0.0	0.0	0.085538	0.471349
270.0	26.600	5.62000	4.400	5.88000	11.758	0.00428	0.0	0.0	0.081333	0.552742
271.0	17.800	4.11000	-1.700	3.15000	11.709	0.00483	0.0	0.0	0.074284	0.627026
272.0	22.200	3.73000	-1.300	4.20000	11.660	0.00538	0.0	0.0	0.071388	0.698414
273.0	23.900	3.34000	-1.700	5.16000	11.611	0.00592	0.0	0.0	0.073992	0.772406
274.0	23.900	2.49000	2.200	1.95000	11.563	0.00647	0.0	0.0	0.074567	0.846972
275.0	23.300	3.54000	1.100	2.49000	11.514	0.00701	0.0	0.0	0.073757	0.920729
276.0	30.000	1.73000	2.800	1.68000	11.466	0.00755	0.0	0.0	0.083415	1.006145
277.0	28.300	4.28000	7.200	1.28000	11.418	0.00809	0.0	0.0	0.090860	1.097005
278.0	22.800	4.07000	3.900	1.04000	11.371	0.00862	0.0	0.0	0.072390	1.167395
279.0	14.400	1.81000	0.600	0.97000	11.323	0.00915	0.510	1.02000	0.065988	1.235383
280.0	19.300	7.65000	-1.700	2.27000	11.276	0.00968	0.0	0.0	0.074231	1.309614
281.0	25.000	1.74000	1.700	2.84000	11.229	0.01021	0.0	0.0	0.075946	1.385560
282.0	27.700	1.97000	1.100	2.53000	11.182	0.01074	0.0	0.0	0.078507	1.464067
283.0	28.700	1.44000	5.500	2.64000	11.135	0.01126	0.0	0.0	0.089309	1.553376
284.0	26.100	3.42000	8.300	2.35000	11.089	0.01177	0.0	0.0	0.084219	1.637594
285.0	19.700	4.65000	6.100	0.88000	11.043	0.01229	3.560	8.13000	0.059679	1.697273
286.0	16.100	6.23000	3.300	2.24000	10.998	0.01280	0.760	1.27000	0.059400	1.756673
287.0	19.400	2.32000	1.700	0.91000	10.952	0.01331	1.020	1.52000	0.068548	1.825221
288.0	18.900	5.84000	-2.800	1.42000	10.907	0.01381	0.0	0.0	0.076283	1.901504
289.0	23.700	2.91000	1.100	2.56000	10.863	0.01431	0.0	0.0	0.074405	1.975909
290.0	27.200	2.22000	3.300	2.06000	10.819	0.01480	0.0	0.0	0.081214	2.057123
291.0	27.200	2.76000	2.800	1.54000	10.775	0.01529	0.0	0.0	0.080476	2.137599

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 1 TO STAGE 2, EMERGE-JOINT

EQUATION IS OF THE FORM

$$\text{RATE} = H(1) + H(2) * TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TM * DL + H(7) * TX * TM$$

CONSTANT TERM FOR EQUATION = -0.007864
 COEFFICIENT FOR TMAX TERM = -0.000054
 COEFFICIENT FOR TMIN TERM = 0.000529
 COEFFICIENT FOR DAYLTH TERM = 0.004447
 COEFFICIENT FOR PRECIP TERM = 0.0
 COEFFICIENT TMAX**2 TERM = 0.0
 COEFFICIENT TMIN**2 TERM = 0.0
 COEFFICIENT DAYLTH**2 TERM = 0.0
 COEFFICIENT PRECIP**2 TERM = 0.0
 COEFFICIENT TMAX*DAYLTH = -0.000223
 COEFFICIENT TMIN*DAYLTH = 0.000281
 COEFFICIENT DAYLTH*PRECIP = 0.0
 COEFFICIENT TMAX*TMIN = 0.000002
 COEFFICIENT TMAX*PRECIP = 0.0
 COEFFICIENT TMIN*PRECIP = 0.0

ORIGINAL PAGE IS
OF POOR QUALITY

REGION = CLO7 CROP YEAR = 1974
 STAGE RUNS FROM DAY 291 TO DAY 140
 LATITUDE = 40.483 STD DEV = 0.317
 LONGITUDE = 103.213 STD DEV = 0.867
 ELEVATION = 1259.433 STD DEV = 147.523

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
291.0	25.500	2.68000	4.400	1.98000	10.775	0.015229	0.0	0.0	0.009001	1.007001
292.0	25.500	2.16000	4.400	2.38000	10.732	0.01578	0.0	0.0	0.009001	1.018002
293.0	-2.400	0.84000	3.900	2.34000	10.699	0.01626	0.0	0.0	0.000357	1.018359
294.0	-24.400	0.91000	4.400	1.38000	10.646	0.01674	0.0	0.0	0.008720	1.027079
295.0	25.500	0.84000	3.300	2.51000	10.604	0.01721	0.0	0.0	0.008803	1.035882
296.0	26.600	1.81000	3.900	3.21000	10.563	0.01767	0.0	0.0	0.009216	1.045098
297.0	25.000	5.42000	6.700	2.39000	10.521	0.01813	0.0	0.0	0.009216	1.054314
298.0	17.800	1.90000	0.0	2.72000	10.481	0.01859	0.0	0.0	0.006172	1.060486
299.0	15.500	2.51000	0.600	1.44000	10.441	0.01904	0.0	0.0	0.005548	1.066034
300.0	13.300	1.50000	-3.700	1.81000	10.401	0.01948	0.0	0.0	0.004377	1.070411
301.0	16.100	2.63000	-2.800	1.33000	10.362	0.01992	0.0	0.0	0.005319	1.075730
302.0	17.800	1.88000	-1.700	1.07000	10.323	0.02036	0.0	0.0	0.005948	1.081678
303.0	17.200	3.48000	1.100	2.92000	10.285	0.02078	0.0	0.0	0.005965	1.087643
304.0	12.800	2.42000	1.100	1.38000	10.248	0.02120	0.0	0.0	0.004441	1.092084
305.0	12.800	5.22000	-1.700	1.42000	10.211	0.02162	0.0	0.0	0.004238	1.096322
306.0	7.800	6.56000	-3.300	1.28000	10.174	0.02203	4.060	5.33000	0.002402	1.098724
307.0	-0.600	1.47000	-3.300	0.72000	10.138	0.02243	1.780	2.54000	0.000646	1.098078
308.0	0.0	1.08000	-3.000	2.76000	10.103	0.02282	5.080	2.54000	0.000550	1.097528
309.0	3.300	2.20000	-5.500	2.24000	10.069	0.02321	0.0	0.0	0.000563	1.094071
310.0	8.300	3.82000	-2.800	3.67000	10.034	0.02359	0.0	0.0	0.002337	1.100428
311.0	9.400	2.76000	-1.700	1.08000	10.001	0.02397	0.0	0.0	0.002683	1.103111
312.0	4.400	7.40000	-1.700	0.72000	9.968	0.02433	0.0	0.0	0.000642	1.103753
313.0	5.500	1.98000	-1.700	2.91000	9.936	0.02469	0.0	0.0	0.000990	1.104743
314.0	17.200	4.46000	-1.100	3.05000	9.905	0.02504	0.0	0.0	0.005681	1.110424
315.0	21.100	2.16000	-1.100	1.80000	9.874	0.02539	0.0	0.0	0.007301	1.117726
316.0	20.000	3.24000	2.800	1.28000	9.844	0.02573	0.0	0.0	0.006681	1.124407
317.0	17.800	3.12000	3.300	2.65000	9.814	0.02606	0.0	0.0	0.005668	1.130074
318.0	15.000	1.34000	-1.100	2.43000	9.786	0.02638	0.0	0.0	0.004682	1.134756
319.0	13.700	1.69000	0.0	1.15000	9.757	0.02669	0.0	0.0	0.004086	1.138842
320.0	13.700	1.11000	-4.400	1.15000	9.730	0.02700	0.0	0.0	0.004426	1.143269
321.0	16.100	1.18000	-4.400	1.71000	9.703	0.02730	0.0	0.0	0.005414	1.148682
322.0	16.100	0.39000	-4.400	2.10000	9.678	0.02753	0.0	0.0	0.005424	1.154105
323.0	13.700	4.34000	-3.700	1.08000	9.652	0.02787	0.0	0.0	0.004363	1.158469
324.0	2.200	1.74000	-7.200	0.47000	9.628	0.02815	6.600	5.33000	0.000675	1.157794
325.0	4.400	3.42000	-12.200	2.47000	9.604	0.02841	0.0	0.0	0.000994	1.158788
326.0	3.700	1.54000	-9.400	3.54000	9.581	0.02867	0.0	0.0	0.000357	1.159145
327.0	4.400	2.79000	-10.000	2.68000	9.559	0.02892	0.0	0.0	0.000663	1.159808
328.0	6.100	2.78000	-10.000	1.75000	9.537	0.02916	0.0	0.0	0.001461	1.161268
329.0	5.500	1.88000	-9.400	2.43000	9.517	0.02939	0.0	0.0	0.001070	1.162330
330.0					9.497	0.02961	0.0	0.0	0.000754	1.162592

291.0	25.500	2.68000	4.400	1.10000	10.712	0.01578	0.0	0.0	0.000001	1.018359
292.0	25.500	2.16000	4.400	2.14000	10.689	0.01626	0.0	0.0	0.000357	1.027079
293.0	-9.400	0.84000	3.900	1.34000	10.646	0.01674	0.0	0.0	0.008803	1.035882
294.0	24.400	0.91000	4.400	2.51000	10.604	0.01721	0.0	0.0	0.009216	1.045098
295.0	25.500	0.04000	3.300	3.21000	10.563	0.01767	0.0	0.0	0.009216	1.054314
296.0	26.600	1.81000	3.900	2.49000	10.521	0.01813	0.0	0.0	0.006172	1.063486
297.0	25.600	5.42000	6.700	2.77000	10.481	0.01859	0.0	0.0	0.005543	1.066034
298.0	17.800	1.90000	0.0	1.44000	10.441	0.01904	0.0	0.0	0.004377	1.073411
299.0	15.500	2.51000	0.600	1.83000	10.401	0.01948	0.0	0.0	0.005319	1.075730
300.0	13.100	1.50000	-3.700	1.31000	10.362	0.01992	0.0	0.0	0.005948	1.081673
301.0	16.100	2.03000	-2.800	1.07000	10.323	0.02036	0.0	0.0	0.005965	1.087643
302.0	17.800	1.88000	-1.700	2.92000	10.285	0.02078	0.0	0.0	0.004441	1.092084
303.0	17.200	3.44000	1.100	1.38000	10.248	0.02120	0.0	0.0	0.004238	1.096322
304.0	12.800	5.22000	-1.700	1.42000	10.211	0.02162	0.0	0.0	0.002402	1.096724
305.0	12.800	5.22000	-1.700	1.28000	10.174	0.02203	4.060	5.33000	0.000646	1.098078
306.0	7.800	6.56000	-3.300	0.72000	10.138	0.02243	1.780	2.54000	0.000550	1.097528
307.0	-0.600	1.47000	-3.300	2.76000	10.103	0.02282	5.080	0.000563	0.000000	1.094001
308.0	0.0	1.08000	-5.000	2.24000	10.069	0.02321	0.0	0.0	0.002337	1.100428
309.0	3.300	2.20000	-2.800	3.67000	10.034	0.02359	0.0	0.0	0.002683	1.103111
310.0	8.300	3.82000	-2.800	1.08000	10.001	0.02397	0.0	0.0	0.000642	1.103753
311.0	9.400	2.76000	-1.700	0.72000	9.968	0.02433	0.0	0.0	0.000990	1.104743
312.0	4.400	0.74000	-1.700	2.91000	9.936	0.02469	0.0	0.0	0.005681	1.110424
313.0	5.500	1.98000	-1.700	3.05000	9.905	0.02504	0.0	0.0	0.007301	1.117726
314.0	17.200	4.46000	-1.100	1.88000	9.874	0.02539	0.0	0.0	0.006681	1.124407
315.0	21.100	2.16000	-1.100	1.28000	9.844	0.02573	0.0	0.0	0.005668	1.130074
316.0	20.000	3.24000	2.800	2.65000	9.814	0.02606	0.0	0.0	0.004682	1.134756
317.0	17.800	3.12000	3.300	2.43000	9.786	0.02638	0.0	0.0	0.004086	1.138842
318.0	15.000	1.34000	-1.100	1.15000	9.757	0.02669	0.0	0.0	0.004425	1.143269
319.0	13.700	1.68000	0.0	1.15000	9.730	0.02700	0.0	0.0	0.005414	1.148682
320.0	13.900	1.11000	-4.400	1.71000	9.703	0.02730	0.0	0.0	0.005424	1.154105
321.0	16.100	1.18000	-4.400	2.10000	9.678	0.02759	0.0	0.0	0.004353	1.158465
322.0	16.100	0.37000	-4.400	1.08000	9.652	0.02787	0.0	0.0	0.000675	1.157794
323.0	13.700	4.34000	-3.900	0.47000	9.628	0.02815	6.600	5.33000	0.000994	1.158783
324.0	2.200	1.74000	-7.200	2.47000	9.604	0.02841	0.0	0.0	0.000357	1.159145
325.0	4.400	3.49000	-12.200	3.54000	9.581	0.02867	0.0	0.0	0.000653	1.159808
326.0	3.700	1.54000	-9.400	2.68000	9.559	0.02892	0.0	0.0	0.001461	1.161268
327.0	4.400	2.79000	-10.000	1.75000	9.537	0.02916	0.0	0.0	0.001070	1.162333
328.0	6.100	2.98000	-10.000	2.43000	9.517	0.02939	0.0	0.0	0.000254	1.162592
329.0	5.500	1.89000	-9.400	2.07000	9.497	0.02961	0.0	0.0	0.000755	1.161837
330.0	4.400	1.73000	-7.800	3.18000	9.478	0.02983	1.780	2.03000	0.002529	1.164365
331.0	2.800	1.28000	-6.700	4.57000	9.459	0.03003	0.0	0.0	0.002529	1.166894
332.0	8.300	5.37000	-10.000	4.57000	9.459	0.03003	0.0	0.0	0.002854	1.169748
333.0	8.300	5.37000	-10.000	1.85000	9.442	0.03023	0.0	0.0	0.001632	1.171380
334.0	10.500	5.02000	-5.500	3.88000	9.425	0.03042	0.0	0.0	0.001327	1.173307
335.0	8.900	5.51000	-3.300	4.11000	9.409	0.03060	0.0	0.0	0.004236	1.177543
336.0	8.300	3.55000	-6.700	2.08000	9.394	0.03077	0.0	0.0	0.002043	1.179586
337.0	12.800	4.01000	-6.700	1.94000	9.380	0.03093	3.300	4.57000	0.000173	1.179413
338.0	10.000	5.16000	-2.800	2.01000	9.366	0.03108	0.0	0.0	0.000190	1.179223
339.0	3.900	1.52000	-7.800	1.69000	9.353	0.03122	0.0	0.0	0.001526	1.180749
340.0	3.900	2.57000	-7.800	2.97000	9.342	0.03135	0.0	0.0	0.002746	1.183405
341.0	5.000	2.98000	-13.300	4.73000	9.331	0.03148	0.0	0.0	0.003143	1.186638
342.0	8.700	6.37000	-7.400	2.13000	9.320	0.03159	0.0	0.0	0.001729	1.188367
343.0	12.200	2.76000	-2.800	2.10000	9.311	0.03170	0.0	0.0	0.002059	1.190426
344.0	8.300	4.73000	-6.100	2.29000	9.302	0.03179	0.0	0.0	0.003185	1.193612
345.0	7.800	5.55000	-8.200	3.43000	9.295	0.03188	0.0	0.0	0.001947	1.195559
346.0	11.700	4.25000	-4.400	1.62000	9.288	0.03196	0.0	0.0	0.001786	1.197345
347.0	10.500	2.64000	-1.700	0.68000	9.282	0.03202	0.0	0.0	0.000690	1.198035
348.0	8.900	2.27000	-5.000	1.15000	9.277	0.03208	0.0	0.0	0.000849	1.198884
349.0	7.800	2.03000	-2.800	1.98000	9.272	0.03213	0.0	0.0	0.004024	1.202909
350.0	7.200	1.36000	-5.000	2.31000	9.269	0.03217	0.0	0.0	0.003567	1.204476
351.0	11.700	4.11000	-8.300	5.07000	9.266	0.03220	0.0	0.0	0.002535	1.209010
352.0	13.300	1.59000	-2.200	1.15000	9.265	0.03222	4.570	4.83000	0.002217	1.206773
353.0	9.400	3.32000	-7.200	4.41000	9.264	0.03223	6.600	4.57000	0.001222	1.205572
354.0	-4.400	3.79000	-18.300	6.88000	9.264	0.03222	0.0	0.0	0.000266	1.205838
355.0	-3.300	3.85000	-20.000	2.31000	9.266	0.03220	0.0	0.0	0.000146	1.205984
356.0	2.800	8.30000	-12.800	2.50000	9.268	0.03217	0.0	0.0	0.000787	1.205197
357.0	5.000	2.62000	-7.200	1.50000	9.272	0.03214	0.0	0.0	0.002633	1.202564
358.0	2.800	2.53000	-8.300	1.28000	9.276	0.03209	1.780	3.05000	0.000579	1.201985
359.0	0.600	1.11000	-5.500	4.63000	9.281	0.03203	1.020	1.52000	0.002274	1.199711
360.0	0.0	1.44000	-8.300	2.14000	9.287	0.03197	0.510	1.02000	0.000494	1.199217
361.0	-0.600	1.33000	-17.200	3.25000	9.294	0.03189	0.0	0.0	0.000431	1.198786
362.0	-2.200	4.27000	-11.100	0.91000	9.301	0.03181	0.0	0.0	0.000368	1.198418
363.0	1.100	3.00000	-13.900	1.39000	9.310	0.03171	0.250	0.25000	0.001966	1.196452
364.0	-1.700	2.77000	-13.300	0.68000	9.319	0.03161	1.270	1.27000	0.003970	1.192482
365.0	-9.400	2.09000	-21.600	2.24000	9.335	0.03120	1.270	1.52000	0.003672	1.188810
366.0	-11.700	2.35000	-27.700	0.78000	9.332	0.03146	0.0	0.0	0.005123	1.183637
367.0	-11.700	4.01000	-21.600	1.60000	9.343	0.03134	0.0	0.0	0.005363	1.178324
368.0	-12.200	3.17000	-21.600	1.14000	9.358	0.03106	1.020	2.03000	0.002969	1.175355
369.0	-10.000	2.84000	-27.200	1.66000	9.382	0.03091	0.0	0.0	0.004977	1.170379
370.0	-12.800	2.97000	-24.400	1.94000	9.396	0.03074	0.0	0.0	0.002599	1.167780
371.0	-8.900	6.19000	-26.600	3.40000	9.411	0.03057	0.510	0.51000	0.001128	1.166652
372.0	-3.900	5.57000	-22.200	2.91000	9.427	0.03039	0.0	0.0	0.001633	1.165019
373.0	-3.300	2.50000	-18.300	2.37000	9.444	0.03020	0.0	0.0	0.003734	1.161285
374.0	-10.500	1.28000	-25.000	4.38000	9.462	0.03001	0.510	1.02000	0.004732	1.156554
375.0	-10.000	2.29000	-18.900	3.60000	9.480	0.02980	0.0	0.25000	0.004627	1.152926

14.0	6.100	2.95000	-7.800	3.28000	9.740	0.02713	0.0	0.0	0.000465	1.152149
15.0	9.400	2.54000	-4.400	4.74000	9.562	0.02889	0.0	0.0	0.001127	1.153275
16.0	10.500	2.66000	-3.900	2.37000	9.504	0.02864	0.0	0.0	0.002239	1.155514
17.0	11.100	1.63000	-4.400	2.05000	9.607	0.02838	0.0	0.0	0.002722	1.158236
18.0	8.300	3.01000	-0.600	3.15000	9.631	0.02811	3.560	5.59000	C.003091	1.161328
19.0	8.200	2.01000	-3.300	1.47000	9.656	0.02783	0.0	0.0	C.003619	1.162947
20.0	7.400	0.70000	-1.700	1.63000	9.681	0.02755	0.0	0.0	C.001987	1.164934
21.0	7.250	3.12000	-3.300	2.35000	9.707	0.02726	0.0	0.0	C.002083	1.167016
22.0	0.600	1.57000	-12.800	0.83000	9.734	0.02696	2.290	2.03000	C.001298	1.168315
23.0	2.800	2.18000	-11.700	0.70000	9.761	0.02665	0.0	0.0	C.000572	1.167743
24.0	5.000	3.71000	-10.500	2.03000	9.790	0.02634	0.0	0.0	C.000274	1.168016
25.0	6.700	3.67000	-9.400	1.92000	9.818	0.02601	0.0	0.0	C.001109	1.169126
26.0	7.200	3.28000	-5.500	3.27000	9.848	0.02568	0.0	0.0	C.001744	1.170870
27.0	5.500	2.13000	-7.200	1.72000	9.878	0.02534	0.0	0.0	C.001709	1.172579
28.0	6.700	1.94000	-7.800	2.14000	9.909	0.02500	0.0	0.0	C.001151	1.173730
29.0	8.900	1.83000	-6.700	3.28000	9.941	0.02464	0.0	0.0	C.001697	1.175427
30.0	11.100	2.26000	-4.400	3.02000	9.973	0.02428	0.0	0.0	C.002544	1.177970
31.0	9.400	1.23000	-5.500	1.15000	10.006	0.02391	0.0	0.0	C.003361	1.181332
32.0	10.500	2.73000	-3.900	0.91000	10.039	0.02354	0.0	0.0	C.002752	1.184084
33.0	10.000	3.15000	-1.700	1.28000	10.073	0.02316	0.0	0.0	C.003183	1.187266
34.0	7.800	1.39000	-5.000	1.50000	10.108	0.02277	0.0	0.0	C.003042	1.190308
35.0	11.700	3.53000	-5.000	1.39000	10.143	0.02237	0.0	0.0	C.002266	1.192575
36.0	8.900	4.30000	-6.100	1.60000	10.179	0.02197	0.250	0.51000	C.003683	1.196257
37.0	1.700	1.61000	-16.100	2.65000	10.216	0.02156	1.520	1.27000	C.002702	1.198959
38.0	-2.800	0.88000	-15.500	4.38000	10.253	0.02114	0.0	0.0	C.000028	1.198987
39.0	1.700	3.62000	-15.000	2.62000	10.290	0.02072	0.0	0.0	C.001356	1.197631
40.0	7.800	3.31000	-10.500	5.65000	10.329	0.02030	0.0	0.0	C.000050	1.197681
41.0	9.400	0.91000	-4.400	1.91000	10.367	0.01986	0.0	0.0	C.002158	1.199839
42.0	12.200	4.31000	-6.100	2.53000	10.406	0.01942	0.0	0.0	C.003138	1.202977
43.0	12.200	3.20000	-4.400	1.92000	10.446	0.01898	0.0	0.0	C.003832	1.206809
44.0	12.800	1.07000	-5.500	1.81000	10.486	0.01853	0.0	0.0	C.004024	1.210833
45.0	11.100	1.64000	-5.500	1.96000	10.527	0.01807	0.0	0.0	C.004072	1.214905
46.0	10.500	1.29000	-5.000	1.68000	10.568	0.01761	0.0	0.0	C.003624	1.218529
47.0	11.700	1.57000	-4.400	2.64000	10.610	0.01714	0.0	0.0	C.003560	1.222089
48.0	14.400	1.73000	-4.400	2.06000	10.652	0.01667	0.0	0.0	C.003981	1.226069
49.0	12.200	2.86000	-3.300	4.40000	10.695	0.01619	0.510	0.51000	C.004651	1.230721
50.0	11.700	3.86000	-5.000	1.65000	10.738	0.01571	0.0	0.0	C.004347	1.235068
51.0	12.200	2.44000	-2.800	1.86000	10.781	0.01523	3.300	3.30000	C.003942	1.239010
52.0	1.700	0.93000	-6.700	2.17000	10.825	0.01473	2.290	2.29000	C.004520	1.243530
53.0	1.700	0.93000	-6.700	2.19000	10.869	0.01424	2.290	2.29000	C.001643	1.245172
54.0	5.500	3.61000	-10.500	1.28000	10.914	0.01374	0.0	0.0	C.001643	1.246815
55.0	7.800	3.24000	-7.200	2.14000	10.959	0.01324	0.510	0.51000	C.001612	1.248428
56.0	2.200	2.05000	-13.300	3.29000	11.004	0.01273	0.760	0.76000	C.002797	1.251225
57.0	8.300	6.07000	-9.400	1.73000	11.050	0.01222	0.0	0.0	C.000436	1.251661
58.0	15.000	0.93000	-5.500	2.59000	11.096	0.01170	0.0	0.0	C.002359	1.254020
59.0	13.900	1.39000	-2.800	1.44000	11.142	0.01118	0.0	0.0	C.004427	1.258447
60.0	19.400	4.24000	-0.600	2.40000	11.188	0.01066	0.0	0.0	C.005059	1.263507
61.0	22.200	0.47000	2.200	1.86000	11.235	0.01014	0.0	0.0	C.005085	1.268592
62.0	21.100	3.57000	0.0	1.36000	11.282	0.00961	0.0	0.0	C.006517	1.275109
63.0	12.800	4.27000	-6.100	2.47000	11.327	0.00909	0.0	0.0	C.007821	1.282940
64.0	17.900	3.16000	-4.400	2.01000	11.373	0.00855	0.0	0.0	C.006909	1.287839
65.0	16.600	4.74000	-1.700	0.91000	11.425	0.00801	0.0	0.0	C.003592	1.293731
66.0	20.000	4.18000	-4.400	1.18000	11.473	0.00747	0.0	0.0	C.004881	1.298611
67.0	20.500	2.86000	-3.300	1.04000	11.521	0.00693	0.0	0.0	C.005880	1.304492
68.0	6.100	1.42000	-3.300	0.99000	11.570	0.00639	0.0	0.0	C.004908	1.309400
69.0	3.300	4.77000	-3.900	0.55000	11.618	0.00585	2.030	2.03000	C.005352	1.314751
70.0	6.700	1.88000	-6.700	1.91000	11.667	0.00530	21.080	7.11000	C.004932	1.319683
71.0	8.900	3.09000	-2.800	1.30000	11.716	0.00475	0.0	0.0	C.004740	1.324423
72.0	9.400	1.77000	-1.700	1.47000	11.765	0.00420	0.0	0.0	C.003581	1.328004
73.0	11.700	6.39000	-4.400	0.93000	11.814	0.00365	0.0	0.0	C.004942	1.332946
74.0	20.000	5.70000	0.600	2.97000	11.863	0.00310	0.510	1.27000	C.005542	1.338488
75.0	22.200	2.71000	4.400	2.05000	11.912	0.00255	0.0	0.0	C.006175	1.344663
76.0	11.100	2.42000	-0.600	0.42000	11.962	0.00200	0.0	0.0	C.004768	1.349431
77.0	10.000	3.23000	-10.500	1.08000	12.011	0.00144	4.570	3.05000	C.007118	1.356549
78.0	3.200	6.33000	-11.100	1.52000	12.061	0.00089	0.0	0.0	C.009167	1.365717
79.0	7.200	1.86000	-7.800	3.37000	12.110	0.00034	1.270	1.27000	C.007047	1.372764
80.0	-1.100	1.25000	-11.100	0.63000	12.160	0.00022	0.0	0.0	C.001517	1.374281
81.0	1.700	4.45000	-13.300	2.87000	12.209	0.00077	1.020	2.29000	C.001786	1.376066
82.0	12.200	6.10000	-7.200	5.66000	12.258	0.00133	6.600	4.32000	C.004742	1.379460
83.0	20.000	3.87000	-1.100	2.54000	12.308	0.00188	0.0	0.0	C.002482	1.381942
84.0	21.100	2.03000	0.0	0.82000	12.357	0.00243	0.0	0.0	C.000805	1.382747
85.0	21.100	1.29000	1.700	1.33000	12.407	0.00299	0.0	0.0	C.003147	1.385874
86.0	21.100	2.24000	-5.000	2.20000	12.456	0.00354	0.0	0.0	C.006039	1.391934
87.0	20.500	2.48000	-3.300	1.07000	12.505	0.00409	0.0	0.0	C.006612	1.398546
88.0	19.400	1.31000	-6.700	1.73000	12.554	0.00464	0.0	0.0	C.007800	1.406346
89.0	17.900	4.24000	-0.600	2.40000	12.603	0.00519	0.0	0.0	C.010187	1.416533
90.0	15.000	0.93000	-5.500	1.65000	12.652	0.00573	0.0	0.0	C.009106	1.425639
91.0	13.900	1.39000	-2.800	1.44000	12.700	0.00628	1.270	1.52000	C.010299	1.435938
92.0	12.800	4.27000	-6.100	2.47000	12.749	0.00682	0.0	0.0	C.006899	1.442837
93.0	12.200	3.20000	-4.400	1.92000	12.797	0.00736	9.140	16.26000	C.008112	1.450949
94.0	12.200	3.20000	-4.400	1.92000	12.845	0.00790	0.0	0.0	C.005252	1.456231
95.0	12.200	3.20000	-4.400	1.92000	12.893	0.00843	0.0	0.0	C.004386	1.460587
96.0	12.200	3.20000	-4.400	1.92000	12.940	0.00897	0.0	0.0	C.005475	1.466062
97.0	12.200	3.20000	-4.400	1.92000	12.988	0.00950	5.590	10.41000	C.005121	1.471183
98.0	12.200	3.20000	-4.400	1.92000	13.035	0.01003	0.510	1.02000	C.009222	1.480405
99.0	12.200	3.20000	-4.400	1.92000	13.083	0.01056	0.0	0.0	C.005268	1.485673

60.0	19.400	4.74000	-0.600	2.40000	11.188	0.01066	0.0	0.0	0.006517	1.275157
61.0	22.200	0.47000	2.200	1.86000	11.235	0.01014	0.0	0.0	0.007821	1.242930
62.0	21.100	3.59000	0.0	1.36000	11.282	0.00961	0.0	0.0	0.006909	1.249839
63.0	17.800	4.27000	-4.100	2.47000	11.377	0.00855	0.0	0.0	0.003892	1.293731
64.0	17.100	3.16000	-4.400	2.01000	11.425	0.00801	0.0	0.0	0.004881	1.298611
65.0	16.600	4.78000	-1.700	0.91000	11.473	0.00747	0.0	0.0	0.005880	1.304492
66.0	20.000	4.18000	-4.400	1.18000	11.521	0.00693	0.0	0.0	0.004908	1.309400
67.0	20.500	2.96000	-3.300	1.04000	11.570	0.00639	0.0	0.0	0.005352	1.314751
68.0	6.100	1.42000	-3.300	0.99000	11.618	0.00585	2.030	2.03000	0.004932	1.319683
69.0	3.900	4.77000	-3.900	0.55000	11.667	0.00530	21.080	7.11000	0.004740	1.324423
70.0	6.700	1.88000	-6.700	1.91000	11.716	0.00475	0.0	0.0	0.003581	1.329304
71.0	8.900	3.07000	-3.900	3.40000	11.765	0.00420	0.0	0.0	0.004242	1.332546
72.0	9.400	2.13000	-2.800	1.30000	11.814	0.00365	0.0	0.0	0.005542	1.338488
73.0	9.400	1.77000	-1.700	1.47000	11.853	0.00310	0.510	1.27000	0.006175	1.344663
74.0	11.700	6.37000	-4.400	0.93000	11.912	0.00255	0.0	0.0	0.004768	1.349431
75.0	20.000	5.70000	0.600	2.97000	11.962	0.00200	0.0	0.0	0.007118	1.356549
76.0	22.200	2.71000	4.400	2.05000	12.011	0.00144	0.0	0.0	0.007167	1.365717
77.0	11.100	2.42000	0.600	0.47000	12.061	0.00089	4.570	3.05000	0.007047	1.372764
78.0	10.600	3.27000	-10.500	1.08000	12.110	0.00034	1.270	1.27000	0.001517	1.374281
79.0	3.900	6.33000	-11.100	1.52000	12.160	0.00022	0.0	0.0	0.001786	1.376066
80.0	7.200	1.86000	-7.800	3.37000	12.209	0.00077	1.020	2.29000	0.003394	1.377460
81.0	-1.100	1.75000	-11.100	0.63000	12.258	0.00133	6.600	4.32000	0.002482	1.381942
82.0	1.700	4.45000	-13.300	2.87000	12.308	0.00188	0.0	0.0	0.000805	1.382747
83.0	12.200	6.10000	-7.200	5.66000	12.357	0.00243	0.0	0.0	0.001147	1.385834
84.0	20.000	3.87000	-1.100	2.54000	12.407	0.00299	0.0	0.0	0.006039	1.391234
85.0	21.100	2.03000	0.0	0.82000	12.456	0.00354	0.0	0.0	0.006612	1.396546
86.0	21.100	1.29000	1.700	1.33000	12.505	0.00409	0.0	0.0	0.007800	1.406346
87.0	21.100	2.24000	5.000	2.20000	12.554	0.00464	0.0	0.0	0.010187	1.416533
88.0	20.500	2.90000	3.300	1.07000	12.603	0.00519	0.0	0.0	0.009106	1.425639
89.0	21.100	3.27000	5.000	1.64000	12.652	0.00573	0.0	0.0	0.010299	1.435918
90.0	15.500	1.31000	-1.100	2.03000	12.700	0.00628	1.270	1.52000	0.006999	1.442837
91.0	17.900	3.06000	-1.100	1.53000	12.749	0.00682	0.0	0.0	0.008112	1.450749
92.0	15.500	5.67000	-3.300	1.06000	12.797	0.00736	9.140	16.26000	0.005252	1.456201
93.0	8.300	3.14000	-6.700	1.73000	12.845	0.00790	0.0	0.0	0.004386	1.460587
94.0	12.800	3.02000	-3.900	2.35000	12.893	0.00843	0.0	0.0	0.005475	1.466062
95.0	19.400	4.26000	-2.200	1.05000	12.940	0.00897	0.0	0.0	0.005121	1.471183
96.0	17.800	4.77000	2.200	1.65000	12.988	0.00950	5.590	10.41000	0.009222	1.480405
97.0	15.500	2.70000	-3.300	2.58000	13.035	0.01003	0.510	1.02000	0.005268	1.485673
98.0	18.700	2.24000	-1.100	1.53000	13.082	0.01055	0.0	0.0	0.006152	1.491624
99.0	20.000	3.64000	3.900	2.66000	13.129	0.01108	0.0	0.0	0.010208	1.502033
100.0	12.800	6.94000	1.700	1.23000	13.175	0.01159	3.560	2.03000	0.010547	1.512579
101.0	12.800	4.27000	0.0	0.70000	13.221	0.01211	1.020	1.52000	0.009123	1.521702
102.0	12.800	6.67000	-1.100	1.15000	13.267	0.01262	11.940	7.62000	0.008199	1.529902
103.0	10.600	5.48000	-1.100	2.31000	13.312	0.01313	0.510	0.76000	0.009232	1.539114
104.0	12.200	2.67000	-2.200	0.95000	13.357	0.01363	0.0	0.0	0.007507	1.546640
105.0	17.200	1.05000	-5.500	1.39000	13.402	0.01413	0.0	0.0	0.002567	1.549208
106.0	21.100	2.18000	0.0	1.66000	13.446	0.01463	0.0	0.0	0.006362	1.555570
107.0	21.700	1.39000	1.100	1.63000	13.490	0.01512	0.0	0.0	0.004357	1.561927
108.0	23.700	1.14000	6.700	2.68000	13.533	0.01561	1.020	2.03000	0.011932	1.573859
109.0	21.100	3.91000	5.500	1.39000	13.576	0.01609	1.020	1.78000	0.011869	1.585728
110.0	15.000	2.54000	2.200	2.09000	13.619	0.01657	0.510	1.02000	0.011066	1.596794
111.0	17.900	3.71000	-2.800	3.17000	13.661	0.01704	0.0	0.0	0.004835	1.601629
112.0	22.400	2.41000	1.100	2.14000	13.703	0.01751	0.0	0.0	0.006711	1.608340
113.0	27.200	2.29000	5.000	3.43000	13.744	0.01797	0.0	0.0	0.008911	1.617251
114.0	27.700	1.47000	6.700	2.04000	13.785	0.01843	0.0	0.0	0.010512	1.627763
115.0	28.300	2.07000	12.200	3.09000	13.825	0.01888	0.0	0.0	0.016241	1.644004
116.0	27.200	2.07000	8.900	2.29000	13.865	0.01933	0.0	0.0	0.013171	1.657175
117.0	21.600	1.78000	2.800	3.34000	13.905	0.01977	0.0	0.0	0.009088	1.666263
118.0	18.300	2.66000	4.400	1.43000	13.943	0.02021	3.560	7.37000	0.012464	1.678727
119.0	19.400	3.75000	1.700	2.18000	13.982	0.02063	0.0	0.0	0.008970	1.687637
120.0	23.300	3.09000	3.900	2.81000	14.019	0.02106	0.0	0.0	0.009537	1.697234
121.0	25.000	2.44000	7.200	1.20000	14.057	0.02147	0.250	0.51000	0.012482	1.709716
122.0	22.400	3.49000	0.600	1.90000	14.093	0.02188	0.250	0.51000	0.006007	1.715724
123.0	17.400	1.57000	3.300	2.14000	14.129	0.02229	0.0	0.0	0.010914	1.726638
124.0	21.600	1.90000	2.200	1.33000	14.165	0.02268	0.0	0.0	0.008494	1.735132
125.0	26.600	2.58000	3.900	1.71000	14.199	0.02308	0.0	0.0	0.007828	1.742960
126.0	27.200	2.37000	10.500	1.04000	14.234	0.02346	0.0	0.0	0.015423	1.758382
127.0	26.600	1.74000	8.300	2.10000	14.267	0.02384	0.0	0.0	0.013129	1.771511
128.0	27.700	1.65000	10.000	1.71000	14.300	0.02420	0.0	0.0	0.014627	1.786138
129.0	26.100	3.42000	11.100	1.60000	14.333	0.02457	2.290	2.03000	0.016964	1.803042
130.0	23.300	3.41000	4.400	4.96000	14.364	0.02492	0.250	0.76000	0.010275	1.813317
131.0	25.000	2.97000	1.100	2.10000	14.395	0.02527	0.250	0.51000	0.005197	1.818516
132.0	26.100	2.27000	8.300	4.12000	14.426	0.02561	0.0	0.0	0.013555	1.832071
133.0	20.000	3.12000	4.400	1.44000	14.455	0.02594	0.0	0.0	0.012272	1.844349
134.0	23.700	5.40000	5.000	2.87000	14.484	0.02627	0.0	0.0	0.010735	1.855084
135.0	25.500	4.12000	7.200	4.52000	14.513	0.02659	0.0	0.0	0.012593	1.867677
136.0	21.100	1.08000	11.100	0.82000	14.540	0.02690	0.0	0.0	0.020273	1.887950
137.0	22.200	2.68000	11.700	1.15000	14.567	0.02720	0.0	0.0	0.020455	1.908405
138.0	24.400	5.34000	11.700	3.77000	14.594	0.02749	0.0	0.0	0.016122	1.924528
139.0	30.500	6.03000	13.900	3.97000	14.619	0.02778	0.760	1.52000	0.018367	1.942897

ELEVATION= 903.122

STD DEV = 206.017

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
275.0	31.100	1.40000	15.500	2.58000	11.595	0.00471	0.0	0.0	0.014436	1.014436
276.0	24.300	1.34000	8.300	0.90000	11.553	0.00507	0.0	0.0	0.010710	1.025346
277.0	30.000	2.02000	7.800	3.22000	11.512	0.00543	0.0	0.0	0.010787	1.036133
278.0	22.800	1.92000	5.500	1.73000	11.470	0.00579	0.0	0.0	0.009270	1.045403
279.0	22.200	0.28000	1.700	1.20000	11.429	0.00615	0.0	0.0	0.007642	1.053045
280.0	25.500	0.95000	4.400	1.30000	11.387	0.00650	0.0	0.0	0.009003	1.062048
281.0	30.000	1.23000	7.800	2.24000	11.346	0.00686	0.0	0.0	0.010794	1.072842
282.0	25.000	2.60000	4.400	1.32000	11.306	0.00721	0.0	0.0	0.008949	1.081720
283.0	21.600	0.74000	3.300	1.06000	11.265	0.00756	0.0	0.0	0.008151	1.089942
284.0	23.700	1.94000	5.000	2.03000	11.225	0.00791	0.0	0.0	0.007011	1.098753
285.0	21.600	2.09000	8.900	2.26000	11.185	0.00825	0.760	0.76000	0.007288	1.108941
286.0	20.000	1.05000	5.500	1.84000	11.145	0.00859	1.020	1.52000	0.008565	1.117506
287.0	22.200	1.47000	1.700	1.23000	11.106	0.00893	0.0	0.0	0.007648	1.125154
288.0	23.300	0.28000	2.200	1.15000	11.067	0.00927	0.0	0.0	0.008069	1.133223
289.0	28.500	1.47000	4.400	1.83000	11.028	0.00961	0.0	0.0	0.009580	1.142803
290.0	32.200	0.96000	7.800	2.31000	10.990	0.00994	0.0	0.0	0.011215	1.154018
291.0	27.200	2.97000	7.800	5.42000	10.952	0.01027	0.0	0.0	0.010271	1.164289
292.0	21.600	5.48000	3.900	3.64000	10.914	0.01059	0.0	0.0	0.008109	1.172398
293.0	18.700	3.22000	-2.200	0.72000	10.876	0.01092	0.0	0.0	0.006041	1.178439
294.0	26.100	1.23000	-0.600	1.46000	10.839	0.01124	0.0	0.0	0.007896	1.186335
295.0	27.700	1.59000	4.400	2.22000	10.803	0.01155	0.0	0.0	0.009485	1.195820
296.0	25.500	1.77000	4.400	4.60000	10.767	0.01187	0.0	0.0	0.009001	1.204821
297.0	22.800	2.14000	0.500	1.23000	10.731	0.01218	0.0	0.0	0.007563	1.212385
298.0	19.400	0.96000	6.700	4.26000	10.695	0.01248	5.590	11.18000	0.007959	1.220344
299.0	20.000	1.60000	5.000	3.22000	10.660	0.01278	2.030	2.29000	0.007726	1.228070
300.0	21.600	2.72000	3.300	5.77000	10.626	0.01308	0.0	0.0	0.007791	1.235861
301.0	23.300	1.05000	5.500	5.01000	10.592	0.01338	0.0	0.0	0.008602	1.244463
302.0	23.400	2.73000	5.500	5.26000	10.558	0.01367	0.0	0.0	0.008879	1.253342
303.0	24.400	2.14000	5.500	3.19000	10.525	0.01395	0.0	0.0	0.008860	1.262202
304.0	28.300	1.31000	8.300	2.03000	10.492	0.01424	0.0	0.0	0.010405	1.272607
305.0	25.000	1.87000	9.400	4.95000	10.460	0.01451	0.0	0.0	0.009541	1.282149
306.0	25.500	1.20000	4.400	2.88000	10.428	0.01479	0.0	0.25000	0.009000	1.291148
307.0	25.500	0.95000	11.100	3.43000	10.397	0.01506	0.0	0.0	0.009811	1.300959
308.0	21.100	2.54000	7.900	2.54000	10.366	0.01532	0.760	1.52000	0.007960	1.308920
309.0	11.100	1.38000	3.300	2.54000	10.336	0.01558	17.780	4.83000	0.004244	1.313164
310.0	10.500	4.06000	3.900	2.88000	10.307	0.01584	18.800	16.51000	0.004003	1.317167
311.0	14.400	1.42000	5.500	3.31000	10.278	0.01609	1.780	3.05000	0.005332	1.322499
312.0	18.700	2.15000	4.400	2.52000	10.249	0.01634	0.0	0.0	0.006732	1.329231
313.0	22.800	1.72000	3.300	3.30000	10.221	0.01658	0.0	0.0	0.007981	1.337211
314.0	23.300	2.58000	5.500	2.82000	10.194	0.01682	0.0	0.0	0.008282	1.345473
315.0	23.300	1.23000	8.300	4.15000	10.167	0.01705	0.0	0.0	0.008408	1.353901
316.0	21.600	1.83000	7.800	6.44000	10.141	0.01727	0.0	0.0	0.007709	1.361610
317.0	17.800	0.95000	1.100	2.33000	10.115	0.01750	0.0	0.0	0.006028	1.367638
318.0	21.600	1.93000	0.600	0.46000	10.090	0.01771	0.0	0.0	0.007412	1.375051
319.0	23.300	1.90000	8.900	5.31000	10.065	0.01792	0.760	1.52000	0.008262	1.383313
320.0	20.000	1.23000	1.100	1.14000	10.042	0.01813	6.860	9.14000	0.006815	1.390128
321.0	6.100	2.97000	-0.600	0.94000	10.018	0.01833	17.530	13.72000	0.001426	1.391554
322.0	4.400	1.05000	-0.600	1.46000	9.996	0.01853	4.060	3.30000	0.000695	1.392249
323.0	4.400	1.05000	-1.100	0.0	9.974	0.01871	3.810	2.03000	0.000639	1.392888
324.0	3.300	0.78000	-3.900	1.14000	9.953	0.01890	2.290	2.03000	0.000484	1.393371
325.0	10.500	2.41000	-3.300	1.60000	9.932	0.01908	0.0	0.0	0.003053	1.396424
326.0	6.700	6.33000	-5.500	1.47000	9.912	0.01925	0.0	0.0	0.001591	1.398015
327.0	10.000	1.92000	-5.000	1.36000	9.893	0.01942	0.0	0.0	0.002881	1.400896
328.0	12.200	1.43000	-2.800	2.76000	9.874	0.01958	0.0	0.0	0.003665	1.404561
329.0	11.900	0.76000	-2.200	0.72000	9.856	0.01973	0.0	0.0	0.004330	1.408871
330.0	21.100	2.41000	-1.100	1.63000	9.839	0.01988	0.0	0.0	0.007321	1.416212
331.0	12.800	4.99000	-3.300	0.96000	9.822	0.02003	0.0	0.0	0.003902	1.420114
332.0	10.000	0.55000	-2.200	1.40000	9.806	0.02017	0.0	0.0	0.002611	1.422726
333.0	14.100	0.72000	-4.400	1.39000	9.791	0.02030	0.0	0.0	0.004175	1.426900
334.0	8.700	2.05000	-5.500	0.95000	9.776	0.02042	0.0	0.0	0.002350	1.429251
335.0	7.200	3.96000	-9.400	1.20000	9.762	0.02054	0.0	0.0	0.001941	1.431192
336.0	16.500	4.47000	-1.700	0.54000	9.749	0.02066	0.0	0.0	0.005412	1.436603
337.0	10.500	1.92000	-4.400	0.53000	9.736	0.02077	0.760	1.52000	0.002921	1.439524
338.0	-1.100	1.66000	-9.400	0.46000	9.725	0.02087	13.210	8.89000	0.001695	1.437830
339.0	-4.400	0.32000	-11.100	1.53000	9.714	0.02096	7.620	8.64000	0.002962	1.434868
340.0	1.700	2.78000	-16.600	1.43000	9.703	0.02105	0.510	1.27000	0.000319	1.435187
341.0	1.100	1.83000	-13.300	1.40000	9.694	0.02114	0.0	0.0	0.000323	1.434864
342.0	2.200	0.55000	-11.700	1.39000	9.685	0.02121	0.0	0.0	0.000033	1.434831
343.0	6.700	0.78000	-8.900	0.78000	9.677	0.02128	0.0	0.0	0.001643	1.436475
344.0	6.700	2.14000	-7.800	0.53000	9.669	0.02135	0.0	0.0	0.001514	1.437988
345.0	8.100	1.66000	-1.700	2.31000	9.663	0.02140	10.920	13.72000	0.000517	1.438505
346.0	11.700	1.46000	-4.400	1.23000	9.657	0.02146	0.0	0.0	0.003404	1.441909
347.0	7.800	1.57000	-1.100	1.06000	9.651	0.02150	0.250	0.51000	0.001210	1.443119
348.0	7.200	0.78000	-7.800	1.47000	9.644	0.02157	0.0	0.0	0.001723	1.444842
349.0	9.400	1.20000	-6.700	1.83000	9.643	0.02157	0.0	0.0	0.002601	1.447442
350.0	14.100	1.23000	-1.100	0.70000	9.640	0.02160	0.0	0.0	0.005083	1.452525
351.0	11.100	1.84000	-7.800	3.20000	9.638	0.02162	0.0	0.0	0.003510	1.456035
352.0	-6.700	2.19000	-17.200	0.46000	9.636	0.02163	0.0	0.0	0.003249	1.452746
353.0	1.100	2.43000	-16.100	1.14000	9.635	0.02164	0.510	1.27000	0.000025	1.452772
354.0	12.800	1.97000	-5.500	0.72000	9.635	0.02164	0.510	1.02000	0.000029	1.456801

117.0	17.800	0.95000	1.100	2.33000	10.111	0.01770	0.0	0.0	0.004070	1.307870
318.0	21.600	1.80000	0.600	0.46300	10.090	0.01771	0.0	0.0	0.007413	1.375091
319.0	21.100	1.90000	8.900	5.31000	10.065	0.01792	0.760	1.52000	0.008262	1.383113
320.0	20.000	1.23000	1.100	1.14000	10.042	0.01813	6.860	9.14000	0.006815	1.390128
321.0	6.100	2.77000	-0.600	0.94000	10.018	0.01833	17.530	13.72000	0.001426	1.391554
322.0	4.400	1.04000	-0.600	1.46000	9.976	0.01853	4.060	3.30000	0.000695	1.392249
323.0	4.400	1.06000	-1.100	0.0	9.974	0.01871	3.810	2.03000	0.000639	1.392888
324.0	3.700	0.78000	-3.900	1.14000	9.953	0.01890	2.290	2.03000	0.000484	1.393371
325.0	10.500	2.41000	-3.300	1.60000	9.912	0.01908	0.0	0.0	0.003053	1.396424
326.0	6.700	6.31000	-5.500	1.47000	9.912	0.01925	0.0	0.0	0.001591	1.398015
327.0	10.000	1.72000	-5.000	1.36000	9.893	0.01942	0.0	0.0	0.002801	1.400896
328.0	12.200	1.43000	-2.800	2.76000	9.874	0.01958	0.0	0.0	0.003565	1.404561
329.0	11.400	0.70000	-2.200	0.72000	9.856	0.01973	0.0	0.0	0.004330	1.408891
330.0	21.100	2.41000	-1.100	1.63000	9.839	0.01988	0.0	0.0	0.007321	1.416211
331.0	12.400	4.97000	-3.300	0.76000	9.822	0.02003	0.0	0.0	0.003902	1.420114
332.0	10.000	0.55000	-2.200	1.40000	9.806	0.02017	0.0	0.0	0.002611	1.422726
333.0	11.100	0.72000	-4.400	1.39000	9.791	0.02030	0.0	0.0	0.004175	1.426900
334.0	8.100	2.05000	-5.500	0.95000	9.776	0.02042	0.0	0.0	0.002350	1.429251
335.0	7.200	3.94000	-9.400	1.20000	9.762	0.02054	0.0	0.0	0.001941	1.431192
336.0	15.600	4.47000	-1.700	0.53000	9.749	0.02066	0.0	0.0	0.005412	1.436603
337.0	10.500	1.72000	-4.400	0.53000	9.736	0.02077	0.760	1.52000	0.002921	1.439524
338.0	-1.100	1.66000	-9.400	0.46000	9.725	0.02087	13.210	8.89000	-0.001695	1.437830
339.0	-4.400	0.32000	-11.100	1.53000	9.714	0.02096	7.620	8.64000	-0.002962	1.434868
340.0	1.700	2.28000	-16.600	1.43000	9.703	0.02105	0.510	1.27000	0.000319	1.435187
341.0	1.100	1.83000	-13.300	1.40000	9.694	0.02114	0.0	0.0	-0.000323	1.434864
342.0	2.200	0.55000	-11.700	1.39000	9.685	0.02121	0.0	0.0	-0.000033	1.434831
343.0	6.700	0.70000	-8.900	0.78000	9.677	0.02128	0.0	0.0	0.001643	1.436475
344.0	6.700	2.14000	-7.800	0.51000	9.669	0.02135	0.0	0.0	0.001514	1.437908
345.0	6.100	1.66000	-1.700	2.31000	9.663	0.02140	10.920	13.72000	0.000517	1.438505
346.0	11.700	1.46000	-4.400	1.23000	9.657	0.02146	0.0	0.0	0.003404	1.441709
347.0	7.800	1.57000	-1.100	1.06000	9.651	0.02150	0.250	0.51000	0.001710	1.443119
348.0	7.200	0.73000	-7.800	1.47000	9.644	0.02157	0.0	0.0	0.001723	1.444842
349.0	7.400	1.27000	-6.700	1.83000	9.643	0.02157	0.0	0.0	0.002601	1.447442
350.0	16.100	1.23000	-1.100	0.70000	9.640	0.02160	0.0	0.0	0.005083	1.452525
351.0	11.100	1.84000	-7.800	3.20000	9.618	0.02162	0.0	0.0	0.003510	1.456035
352.0	-6.700	2.15000	-17.200	0.46000	9.616	0.02163	0.0	0.0	-0.003289	1.452746
353.0	1.100	2.45000	-16.100	1.14000	9.615	0.02164	0.510	1.27000	0.000025	1.452772
354.0	12.800	1.97000	-5.500	0.72000	9.615	0.02164	0.510	1.02000	0.004029	1.456801
355.0	10.000	2.93000	-6.700	0.72000	9.616	0.02163	0.0	0.0	0.002874	1.456775
356.0	15.500	0.70000	-3.700	1.63000	9.617	0.02162	0.0	0.0	0.005105	1.464780
357.0	21.600	1.14000	1.100	1.39000	9.640	0.02160	0.0	0.0	0.007452	1.472232
358.0	20.500	1.87000	0.600	0.28000	9.643	0.02158	0.0	0.0	0.006981	1.479213
359.0	17.800	3.75000	2.200	1.94000	9.646	0.02155	0.0	0.0	0.005544	1.484756
360.0	17.800	2.35000	-1.100	0.90000	9.651	0.02151	0.0	0.0	0.005884	1.490640
361.0	10.000	6.06000	-7.200	4.54000	9.656	0.02146	0.0	0.0	0.002937	1.493577
362.0	12.200	4.61000	-4.400	2.29000	9.662	0.02141	0.0	0.0	0.003637	1.497214
363.0	26.500	1.70000	5.500	2.72000	9.668	0.02136	0.0	0.0	0.006531	1.503745
364.0	18.300	2.19000	0.0	4.01000	9.675	0.02129	0.0	0.0	0.006294	1.510039
365.0	10.000	4.13000	-2.200	1.72000	9.683	0.02122	0.0	0.0	0.002415	1.512455
366.0	11.100	1.14000	-2.200	1.66000	9.672	0.02115	0.0	0.0	0.002932	1.515386
1.0	15.500	2.81000	2.200	2.37000	9.695	0.02112	0.0	0.0	0.004532	1.515918
2.0	6.100	0.46000	-5.000	1.63000	9.705	0.02109	0.0	0.0	0.000977	1.520825
3.0	8.900	2.70000	-8.900	1.01000	9.715	0.02095	0.0	0.0	0.002629	1.523524
4.0	18.100	0.28000	-2.200	3.25000	9.726	0.02085	0.0	0.0	0.006210	1.529714
5.0	16.100	2.73000	-1.100	0.72000	9.738	0.02075	0.0	0.0	0.005137	1.534871
6.0	22.800	1.23000	-1.700	1.46000	9.751	0.02064	0.0	0.0	0.008167	1.543038
7.0	23.300	2.14000	12.800	3.98000	9.764	0.02053	0.0	0.0	0.007496	1.550533
8.0	19.300	2.04000	-2.200	2.41000	9.778	0.02041	0.0	0.0	0.006197	1.556730
9.0	3.700	3.77000	-8.900	4.59000	9.793	0.02028	0.760	1.52000	0.000512	1.557243
10.0	7.200	2.77000	-11.100	2.33000	9.808	0.02015	0.0	0.0	0.002078	1.559321
11.0	10.000	1.14000	-6.100	2.33000	9.824	0.02001	0.0	0.0	0.002898	1.562219
12.0	11.700	2.66000	-7.800	1.53000	9.841	0.01986	0.0	0.0	0.003714	1.565933
13.0	11.700	1.11000	-8.300	1.14000	9.858	0.01971	0.0	0.0	0.003735	1.569668
14.0	14.400	0.73000	-4.400	2.07000	9.876	0.01956	0.0	0.0	0.004649	1.574316
15.0	11.700	1.53000	1.100	4.06000	9.895	0.01939	0.0	0.0	0.003311	1.577628
16.0	7.200	7.81000	-5.500	5.33000	9.915	0.01923	0.0	0.0	0.001795	1.579423
17.0	20.000	1.46000	-3.300	4.23000	9.935	0.01905	0.0	0.0	0.006862	1.586285
18.0	15.500	2.80000	-5.500	0.70000	9.955	0.01887	0.0	0.0	0.005104	1.591390
19.0	15.000	1.34000	-1.100	0.90000	9.977	0.01869	0.0	0.0	0.004835	1.596224
20.0	11.100	0.28000	-6.100	2.09000	9.999	0.01850	0.0	0.0	0.003406	1.599630
21.0	14.400	1.50000	-3.300	0.83000	10.022	0.01830	0.0	0.0	0.004646	1.604276
22.0	15.500	2.45000	-2.200	3.02000	10.045	0.01810	0.0	0.0	0.005073	1.609349
23.0	3.700	3.46000	-1.300	2.81000	10.069	0.01789	3.050	1.52000	0.000768	1.610117
24.0	17.200	4.35000	-9.400	1.53000	10.093	0.01768	0.0	0.0	0.005558	1.615675
25.0	14.400	3.35000	-1.700	1.01000	10.118	0.01747	0.510	0.76000	0.004715	1.620390
26.0	7.200	1.72000	-7.800	1.32000	10.144	0.01724	2.540	3.05000	0.002049	1.622439
27.0	11.100	1.73000	-8.900	1.06000	10.171	0.01702	0.0	0.0	0.003358	1.625797
28.0	7.800	4.45000	-6.700	2.08000	10.197	0.01678	0.0	0.0	0.002323	1.628120
29.0	16.600	2.62000	-8.900	0.78000	10.225	0.01655	0.0	0.0	0.005125	1.633245
30.0	11.100	6.80000	-6.700	2.54000	10.253	0.01636	0.0	0.0	0.005438	1.636683
31.0	17.200	5.50000	-1.700	0.64000	10.282	0.01606	0.0	0.0	0.005752	1.642435
32.0	17.200	8.60000	-8.300	1.31000	10.311	0.01580	0.0	0.0	0.003667	1.646102
33.0	6.700	0.72000	-10.000	0.96000	10.340	0.01555	0.0	0.0	0.001864	1.647965
34.0	10.500	0.95000	-9.400	1.23000	10.371	0.01529	0.0	0.0	0.003032	1.650997
35.0	12.600	1.81000	-8.300	0.78000	10.401	0.01502	0.0	0.0	0.003785	1.654782
1.0	20.000	0.23000	0.0	2.68000	10.433	0.01475	0.0	0.0	0.006799	1.661581

37.0	0.000	1.60000	-5.000	0.70000	10.577	0.01191	2.770	2.29000	0.000331	1.674166
40.0	7.200	2.97000	-4.400	1.97000	10.563	0.01363	1.520	2.79000	0.002787	1.676953
41.0	5.000	2.41000	-5.500	1.52000	10.526	0.01334	2.540	3.05000	0.002131	1.679085
42.0	0.0	1.50000	-10.000	1.23000	10.631	0.01304	4.060	3.56000	0.000335	1.679420
43.0	1.100	2.45000	-14.400	2.14000	10.665	0.01274	1.020	1.78000	0.000043	1.679378
44.0	3.700	4.03000	-9.400	1.59000	10.700	0.01244	0.0	0.0	0.001405	1.680782
45.0	11.100	0.46000	-10.000	1.94000	10.736	0.01213	0.0	0.0	0.002849	1.683631
46.0	6.700	2.95000	-5.500	1.23000	10.772	0.01182	0.0	0.0	0.002802	1.686434
47.0	6.700	1.06000	-10.000	1.26000	10.808	0.01151	0.0	0.0	0.001931	1.688365
48.0	13.300	0.72000	-7.200	0.70000	10.845	0.01119	0.0	0.0	0.003802	1.692167
49.0	17.800	0.90000	-3.300	1.32000	10.882	0.01087	0.0	0.0	0.005559	1.697726
50.0	17.800	0.83000	-1.700	0.83000	10.919	0.01055	0.0	0.0	0.005951	1.703677
51.0	19.400	2.24000	1.100	2.09000	10.957	0.01022	0.0	0.0	0.006983	1.710660
52.0	11.100	4.74000	-5.500	2.50000	10.995	0.00989	0.0	0.0	0.003824	1.714484
53.0	17.800	2.66000	-3.700	4.71000	11.033	0.00956	0.0	0.0	0.005320	1.719304
54.0	15.000	4.06000	-13.300	0.55000	11.072	0.00923	0.0	0.0	0.002130	1.721924
55.0	4.400	1.31000	-17.800	1.14000	11.111	0.00889	0.0	0.0	0.000551	1.721382
56.0	15.500	0.72000	-8.900	2.29000	11.151	0.00855	0.0	0.0	0.003371	1.724753
57.0	22.800	1.23000	-3.900	1.31000	11.191	0.00820	0.0	0.0	0.005823	1.730576
58.0	23.300	1.31000	-1.700	0.70000	11.231	0.00786	0.0	0.0	0.006583	1.737158
59.0	18.900	2.26000	3.300	1.63000	11.271	0.00751	0.0	0.0	0.007846	1.745005
60.0	10.000	3.04000	-3.900	1.59000	11.311	0.00716	0.0	0.0	0.004424	1.749429
61.0	1.700	1.53000	-8.900	1.23000	11.352	0.00681	0.250	0.25000	0.002026	1.751455
62.0	2.200	1.47000	-12.200	1.63000	11.393	0.00645	0.0	0.0	0.000929	1.752384
63.0	6.100	1.23000	-8.900	2.15000	11.434	0.00610	0.0	0.0	0.002406	1.754791
64.0	11.100	0.72000	-6.100	1.01000	11.476	0.00574	0.0	0.0	0.003791	1.758581
65.0	8.900	1.06000	-3.900	0.71000	11.517	0.00538	0.0	0.0	0.004604	1.763185
66.0	13.300	1.53000	-8.900	2.35000	11.559	0.00502	0.0	0.0	0.002691	1.765876
67.0	14.400	0.96000	-2.800	1.36000	11.601	0.00465	0.0	0.0	0.005360	1.771236
68.0	14.400	0.53000	-3.900	1.46000	11.643	0.00429	0.0	0.0	0.004881	1.776117
69.0	11.100	0.95000	-5.500	2.24000	11.686	0.00393	0.0	0.0	0.004121	1.780237
70.0	8.300	2.45000	-1.100	1.63000	11.728	0.00356	3.810	6.86000	0.006198	1.786435
71.0	3.700	2.44000	0.0	0.72000	11.771	0.00319	8.640	7.11000	0.006834	1.793268
72.0	8.900	1.40000	1.100	1.32000	11.813	0.00282	1.520	2.79000	0.007465	1.800734
73.0	11.700	1.37000	-0.600	1.23000	11.856	0.00245	0.250	0.51000	0.006664	1.807398
74.0	15.500	1.66000	-1.700	1.37000	11.899	0.00208	0.0	0.0	0.006034	1.813431
75.0	18.900	2.37000	1.100	2.33000	11.942	0.00171	1.020	1.78000	0.007431	1.820862
76.0	10.500	1.39000	-5.000	2.19000	11.985	0.00134	0.250	0.25000	0.004556	1.825418
77.0	-0.600	4.21000	-11.700	0.90000	12.028	0.00097	0.510	0.51000	0.001758	1.827177
78.0	0.600	3.35000	-11.100	1.32000	12.071	0.00060	0.0	0.0	0.002037	1.829213
79.0	5.000	0.46000	-12.400	4.23000	12.114	0.00023	0.250	0.51000	0.000690	1.829903
80.0	18.900	2.05000	-6.700	2.28000	12.157	0.00015	0.0	0.0	0.000832	1.832735
81.0	21.600	3.05000	-2.200	0.95000	12.200	0.00052	0.0	0.0	0.005261	1.837996
82.0	15.500	1.46000	-2.400	0.70000	12.243	0.00089	0.0	0.0	0.001414	1.839409
83.0	0.0	2.04000	-10.500	0.70000	12.286	0.00126	0.0	0.0	0.002741	1.842150
84.0	0.0	1.73000	-10.500	2.24000	12.329	0.00163	0.250	0.25000	0.002805	1.844955
85.0	11.100	3.46000	-9.400	1.50000	12.372	0.00201	0.0	0.0	0.001537	1.846492
86.0	22.200	0.95000	0.0	1.53000	12.415	0.00238	0.0	0.0	0.006462	1.852954
87.0	25.000	2.01000	2.200	1.66000	12.458	0.00275	0.0	0.0	0.007543	1.860497
88.0	11.700	3.36000	-1.100	2.50000	12.500	0.00311	0.0	0.0	0.007397	1.867894
89.0	15.500	1.50000	-3.300	3.22000	12.543	0.00348	0.0	0.0	0.005235	1.873129
90.0	25.000	1.23000	1.100	1.73000	12.585	0.00385	0.0	0.0	0.006670	1.879778
91.0	25.500	0.53000	7.200	1.53000	12.628	0.00421	0.0	0.0	0.011102	1.890901
92.0	22.800	1.81000	12.200	2.14000	12.670	0.00458	1.020	2.03000	0.015428	1.906329
93.0	26.100	1.05000	7.800	3.91000	12.712	0.00494	10.410	20.83000	0.011512	1.917841
94.0	21.600	0.95000	4.400	2.81000	12.754	0.00530	0.250	0.51000	0.007844	1.927686
95.0	21.600	2.31000	5.000	3.15000	12.796	0.00566	6.600	7.62000	0.010354	1.938040
96.0	22.800	1.14000	2.800	1.83000	12.837	0.00602	0.0	0.0	0.008354	1.946394
97.0	25.000	2.07000	6.700	1.90000	12.878	0.00638	0.0	0.0	0.011010	1.957404

REGION = OKL9 CROP YEAR = 1970
 STAGE RUNS FROM DAY 299 TO DAY 94
 LATITUDE = 34.577 STD DEV = 0.411
 LONGITUDE = 94.997 STD DEV = 6.401
 ELEVATION = 209.398 STD DEV = 59.741

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
299.0	24.400	1.15000	11.100	0.72000	10.768	0.02107	0.760	0.76000	0.010247	1.010247
300.0	19.400	1.25000	7.200	0.37000	10.716	0.02156	0.0	0.0	0.008143	1.018391
301.0	15.600	0.47000	1.700	0.96000	10.764	0.02204	1.780	2.54000	0.006326	1.024716
302.0	12.200	0.91000	4.100	0.84000	10.673	0.02252	2.540	1.27000	0.005987	1.030701
303.0	13.300	0.55000	1.200	0.61000	10.642	0.02299	51.820	16.51000	0.006352	1.037055
304.0	12.200	0.31000	3.200	1.18000	10.612	0.02346	3.300	1.78000	0.005331	1.042386
305.0	15.100	2.92000	0.0	1.40000	10.582	0.02392	0.0	0.0	0.005776	1.048162
306.0	10.500	1.86000	2.800	1.28000	10.553	0.02437	0.0	0.0	0.004638	1.052800
307.0	13.900	1.57000	0.0	0.82000	10.524	0.02481	4.320	2.29000	0.005121	1.057921
308.0	14.400	0.78000	0.0	2.20000	10.495	0.02525	0.760	1.27000	0.005273	1.063144
309.0	21.600	1.28000	-1.700	1.07000	10.467	0.02568	0.0	0.0	0.007030	1.070174
310.0	22.800	0.64000	5.500	4.05000	10.440	0.02610	0.0	0.0	0.008328	1.078502
311.0	25.000	0.94000	7.800	3.17000	10.413	0.02651	0.0	0.0	0.009270	1.087772

11.0	11.700	3.14000	-1.100	2.50000	12.500	0.00111	0.0	0.0	0.001197	1.867894
87.0	15.500	1.50000	-1.300	3.22000	12.543	0.00348	0.0	0.0	0.005235	1.873129
88.0	25.000	1.23000	-1.100	1.73000	12.585	0.00385	0.0	0.0	0.006670	1.879798
91.0	25.500	0.53000	7.200	1.53000	12.628	0.00421	0.0	0.0	0.011102	1.890901
92.0	22.800	1.81000	12.200	2.14000	12.670	0.00458	1.020	2.03000	0.015428	1.906329
93.0	26.100	1.05000	7.800	3.91000	12.712	0.00494	10.410	20.83000	0.011512	1.917841
94.0	21.600	0.95000	4.400	2.81000	12.754	0.00530	0.250	0.51000	0.007844	1.927586
95.0	21.600	2.11000	5.000	3.15000	12.796	0.00566	6.600	7.62000	0.010354	1.939040
96.0	22.800	1.14000	2.800	1.83000	12.837	0.00602	0.0	0.0	0.008354	1.946394
97.0	25.000	2.03000	6.700	1.90000	12.878	0.00638	0.0	0.0	0.011010	1.957404

REGION = OKL9 CROP YEAR = 1970
 STAGE RUNS FROM DAY 299 TO DAY 94
 LATITUDE = 34.577 STD DEV = 0.411
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DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
299.0	24.400	1.15000	11.100	0.72000	10.768	0.02107	0.760	0.76000	0.010247	1.010247
300.0	19.400	3.95000	7.200	0.39000	10.736	0.02156	0.0	0.0	0.008143	1.018391
301.0	15.500	0.49000	1.700	0.94000	10.704	0.02204	1.780	2.54000	0.006326	1.024716
302.0	12.200	0.71000	6.100	0.84000	10.673	0.02252	2.540	1.27000	0.005987	1.030703
303.0	13.300	0.55000	7.200	0.61000	10.642	0.02299	51.820	16.51000	0.006352	1.037055
304.0	12.200	0.31000	3.300	1.18000	10.612	0.02346	3.300	1.78000	0.005331	1.042386
305.0	15.100	2.92000	0.0	1.60000	10.582	0.02392	0.0	0.0	0.005776	1.048162
306.0	10.500	1.86000	2.800	1.28000	10.553	0.02437	0.0	0.0	0.004638	1.052800
307.0	13.900	1.57000	0.0	0.82000	10.524	0.02481	4.320	2.29000	0.005121	1.057921
308.0	14.400	0.78000	0.0	2.20000	10.495	0.02525	0.760	1.27000	0.005223	1.063144
309.0	21.600	1.20000	-1.700	1.07000	10.467	0.02568	0.0	0.0	0.007030	1.070174
310.0	22.400	0.68000	5.500	4.09000	10.440	0.02610	0.0	0.0	0.008328	1.078502
311.0	25.000	0.93000	7.800	3.17000	10.413	0.02651	0.0	0.0	0.009270	1.087772
312.0	25.500	0.73000	4.400	1.65000	10.386	0.02692	0.0	0.0	0.008999	1.096772
313.0	24.400	0.91000	5.500	0.89000	10.360	0.02732	0.0	0.0	0.008749	1.105541
314.0	24.400	1.47000	6.700	1.95000	10.335	0.02771	0.0	0.0	0.008877	1.114417
315.0	25.500	1.60000	10.500	2.80000	10.310	0.02809	1.520	3.30000	0.009589	1.124006
316.0	22.800	1.18000	5.000	1.64000	10.286	0.02846	5.080	6.30000	0.008145	1.132151
317.0	17.800	0.63000	5.500	1.01000	10.262	0.02883	0.0	0.0	0.006453	1.138604
318.0	11.700	4.70000	-2.800	1.22000	10.239	0.02919	0.0	0.0	0.003842	1.142446
319.0	17.300	1.78000	-6.100	2.17000	10.216	0.02953	0.0	0.0	0.005695	1.148141
320.0	17.000	1.15000	3.300	2.13000	10.194	0.02987	0.0	0.0	0.006203	1.154344
321.0	21.600	3.70000	14.400	2.64000	10.172	0.03020	2.750	2.79000	0.008107	1.162451
322.0	13.300	1.98000	2.800	0.68000	10.152	0.03053	40.890	52.58000	0.006305	1.168755
323.0	12.200	2.54000	-3.300	0.99000	10.131	0.03084	1.520	2.03000	0.003895	1.172650
324.0	17.200	4.01000	-3.900	1.86000	10.111	0.03114	0.0	0.0	0.005649	1.178320
325.0	20.500	0.63000	-2.800	2.76000	10.092	0.03144	0.0	0.0	0.005911	1.185231
326.0	20.500	1.55000	2.800	2.93000	10.074	0.03172	0.0	0.0	0.007050	1.192281
327.0	18.300	1.45000	7.200	2.75000	10.056	0.03200	0.0	0.0	0.006251	1.198532
328.0	16.100	1.55000	2.200	2.87000	10.038	0.03226	0.0	0.0	0.005318	1.203850
329.0	20.500	0.93000	4.400	2.46000	10.022	0.03252	0.0	0.0	0.007027	1.210878
330.0	20.000	1.22000	2.200	3.05000	10.006	0.03277	0.0	0.0	0.006806	1.217684
331.0	14.400	1.85000	2.200	1.64000	9.990	0.03300	13.460	4.32000	0.004571	1.222254
332.0	9.400	1.01000	-5.000	2.10000	9.975	0.03323	0.510	1.02000	0.002715	1.224970
333.0	13.700	1.36000	-7.800	1.73000	9.961	0.03345	0.0	0.0	0.004524	1.229493
334.0	17.800	0.91000	-5.000	2.68000	9.948	0.03366	0.0	0.0	0.006006	1.235499
335.0	21.100	1.59000	-1.100	2.14000	9.935	0.03385	0.0	0.0	0.007267	1.242756
336.0	19.400	0.60000	0.0	3.10000	9.923	0.03404	0.0	0.0	0.006557	1.249324
337.0	18.300	1.14000	-0.600	3.50000	9.911	0.03422	0.0	0.0	0.006120	1.255444
338.0	13.900	2.49000	-1.100	4.25000	9.900	0.03439	0.0	0.0	0.004320	1.259764
339.0	9.400	0.68000	2.800	0.84000	9.890	0.03454	3.300	7.62000	0.002256	1.262020
340.0	6.700	2.09000	1.700	0.68000	9.880	0.03469	10.410	10.16000	0.001145	1.263165
341.0	8.300	0.47000	1.100	0.63000	9.871	0.03483	15.750	10.67000	0.001825	1.264920
342.0	9.400	2.15000	-2.800	1.07000	9.863	0.03495	0.0	0.0	0.002486	1.267476
343.0	12.200	1.08000	2.800	1.44000	9.856	0.03507	0.0	0.0	0.003348	1.270824
344.0	7.400	0.63000	4.400	1.01000	9.849	0.03518	0.0	0.25000	0.002030	1.272854
345.0	12.800	1.24000	-0.600	1.08000	9.842	0.03527	0.0	0.0	0.003765	1.276619
346.0	17.800	1.04000	-5.000	1.86000	9.837	0.03536	0.0	0.0	0.006108	1.282727
347.0	20.000	0.71000	2.200	3.57000	9.832	0.03543	0.0	0.0	0.006700	1.289427
348.0	20.000	1.39000	2.800	2.92000	9.828	0.03549	0.0	0.0	0.006669	1.296096
349.0	17.200	2.79000	0.0	3.00000	9.824	0.03555	0.0	0.0	0.005597	1.301693
350.0	13.700	2.20000	-2.800	1.33000	9.822	0.03559	0.0	0.0	0.004341	1.306034
351.0	13.300	1.54000	2.800	1.68000	9.819	0.03562	0.0	0.0	0.003737	1.309771
352.0	16.100	2.31000	8.900	0.72000	9.818	0.03565	0.0	0.0	0.004607	1.314379
353.0	14.400	1.60000	4.400	3.79000	9.817	0.03566	1.270	1.78000	0.004116	1.318495
354.0	11.100	3.74000	3.300	2.68000	9.817	0.03566	1.020	2.54000	0.002738	1.321233
355.0	10.500	2.03000	2.200	0.82000	9.818	0.03565	6.350	4.06000	0.002551	1.323784
356.0	13.700	1.74000	-2.800	1.33000	9.819	0.03563	0.0	0.0	0.004339	1.328123
357.0	14.400	1.42000	1.100	3.05000	9.821	0.03560	0.0	0.0	0.004322	1.332445
358.0	9.400	3.00000	-1.700	1.11000	9.824	0.03556	0.250	0.25000	0.002350	1.334795
359.0	9.400	2.77000	0.600	2.34000	9.827	0.03550	2.540	4.32000	0.002205	1.337000

362.0	15.500	0.64000	5.000	1.60000	9.841	0.03529	15.490	17.02000	0.002466	1.346149
363.0	5.500	2.04000	-1.100	1.07000	9.848	0.03519	52.440	7.37000	0.000706	1.346855
364.0	0.0	0.47000	-3.900	1.38000	9.854	0.03509	5.080	4.32000	-0.001388	1.345467
365.0	3.300	1.50000	-8.900	2.72000	9.862	0.03497	1.780	1.27000	0.000342	1.345809
1.0	10.000	0.72000	-8.300	1.44000	9.873	0.03481	0.0	0.0	0.000309	1.348847
2.0	5.500	1.47000	-2.800	1.80000	9.882	0.03467	0.0	0.0	0.000903	1.349749
3.0	8.300	0.47000	-9.400	2.01000	9.891	0.03452	0.0	0.0	0.002407	1.352157
4.0	10.500	1.45000	-6.700	1.60000	9.902	0.03436	0.0	0.0	0.003165	1.355321
5.0	6.700	1.60000	-1.700	2.87000	9.913	0.03419	5.080	4.57000	0.001415	1.356736
6.0	-0.600	3.88000	-11.100	1.11000	9.924	0.03402	12.950	8.64000	-0.000994	1.355742
7.0	-1.100	3.16000	-16.100	2.79000	9.937	0.03383	0.250	0.76000	-0.000905	1.354837
8.0	-3.900	3.45000	-15.000	2.28000	9.950	0.03363	0.0	0.0	-0.002014	1.352822
9.0	2.200	1.20000	-17.200	2.31000	9.963	0.03342	0.0	0.0	0.000374	1.353126
10.0	2.800	1.11000	-8.300	2.66000	9.977	0.03320	0.0	0.0	0.000270	1.353466
11.0	5.500	0.47000	-0.600	1.11000	9.992	0.03297	0.250	0.25000	0.001115	1.354581
12.0	5.500	1.01000	0.0	2.10000	10.008	0.03273	0.0	0.25000	0.001149	1.355730
13.0	10.000	0.91000	-2.800	2.01000	10.024	0.03248	0.0	0.0	0.002967	1.358677
14.0	11.100	1.11000	-5.000	1.86000	10.041	0.03223	0.0	0.0	0.003413	1.362110
15.0	14.400	1.57000	-4.400	1.72000	10.058	0.03196	0.0	0.0	0.004649	1.366759
16.0	15.000	1.65000	1.700	3.90000	10.076	0.03168	0.0	0.0	0.004951	1.371170
17.0	13.300	1.37000	3.900	2.24000	10.095	0.03140	0.0	0.0	0.004380	1.376091
18.0	8.900	2.58000	-8.300	1.77000	10.114	0.03110	0.250	0.51000	0.002623	1.378714
19.0	-0.600	3.82000	-9.400	1.54000	10.134	0.03080	2.540	2.79000	-0.000682	1.378031
20.0	0.600	0.91000	-9.400	1.69000	10.154	0.03048	0.0	0.0	0.000233	1.377798
21.0	0.600	0.97000	-7.800	0.93000	10.175	0.03016	0.0	0.0	-0.000171	1.377627
22.0	1.700	1.04000	-8.900	1.08000	10.197	0.02983	0.250	0.25000	0.000216	1.377943
23.0	13.900	1.62000	-3.300	1.45000	10.219	0.02949	0.0	0.0	0.004537	1.382382
24.0	13.300	1.20000	-2.800	1.07000	10.242	0.02914	0.0	0.0	0.004378	1.386760
25.0	21.600	0.93000	6.100	2.97000	10.265	0.02878	0.0	0.0	0.007805	1.394565
26.0	22.200	0.72000	1.700	2.05000	10.289	0.02841	0.0	0.0	0.007665	1.402230
27.0	22.200	0.91000	0.0	2.53000	10.314	0.02804	0.0	0.0	0.007508	1.409737
28.0	24.400	1.78000	13.900	5.32000	10.339	0.02766	0.0	0.0	0.007620	1.419358
29.0	22.200	2.10000	2.800	2.29000	10.364	0.02726	0.0	0.0	0.007780	1.427138
30.0	13.300	0.47000	-7.800	2.02000	10.390	0.02686	0.0	0.0	0.003988	1.431126
31.0	15.000	0.63000	-4.400	3.67000	10.417	0.02646	0.0	0.0	0.004825	1.435921
32.0	10.500	1.15000	-1.700	3.41000	10.444	0.02604	3.300	3.05000	0.004202	1.440153
33.0	7.200	0.72000	-3.900	1.55000	10.471	0.02562	26.160	15.75000	0.002696	1.442849
34.0	1.100	4.84000	-10.000	1.52000	10.499	0.02519	2.030	1.78000	0.000410	1.443259
35.0	13.900	0.84000	-7.800	2.40000	10.528	0.02475	0.0	0.0	0.004047	1.447306
36.0	15.000	2.23000	4.400	1.28000	10.557	0.02431	0.0	0.0	0.006112	1.453419
37.0	12.800	1.04000	7.200	1.07000	10.586	0.02385	4.570	4.57000	0.006019	1.459438
38.0	13.900	2.20000	7.800	2.24000	10.616	0.02339	5.840	5.33000	0.006518	1.465956
39.0	15.000	1.33000	5.500	2.10000	10.646	0.02293	2.290	3.81000	0.006514	1.472470
40.0	10.000	1.15000	-1.100	1.49000	10.677	0.02246	0.250	0.51000	0.004198	1.476668
41.0	18.900	1.24000	-6.100	1.68000	10.709	0.02198	0.0	0.0	0.005334	1.482002
42.0	18.300	1.44000	1.100	1.74000	10.740	0.02149	0.0	0.0	0.006637	1.488639
43.0	13.300	2.93000	-4.400	1.54000	10.772	0.02100	0.0	0.0	0.004418	1.493057
44.0	16.600	1.20000	-1.700	1.42000	10.805	0.02050	0.0	0.0	0.005697	1.498756
45.0	15.700	0.49000	3.300	2.40000	10.838	0.01999	0.0	0.0	0.006521	1.505277
46.0	5.500	1.15000	0.0	0.78000	10.871	0.01948	4.060	3.81000	0.003730	1.509207
47.0	13.300	1.13000	-5.500	1.45000	10.905	0.01897	7.620	7.11000	0.004183	1.513390
48.0	20.500	0.95000	-3.900	1.28000	10.939	0.01844	0.0	0.0	0.005953	1.519243
49.0	21.600	0.63000	4.400	1.32000	10.973	0.01792	0.0	0.0	0.008221	1.527534
50.0	12.800	5.54000	-4.400	1.27000	11.008	0.01738	0.0	0.0	0.004397	1.531931
51.0	16.100	1.15000	-6.700	1.83000	11.043	0.01684	0.0	0.0	0.004251	1.536182
52.0	18.300	1.18000	-0.600	3.65000	11.078	0.01630	0.0	0.0	0.006356	1.542538
53.0	14.400	2.13000	5.500	1.74000	11.114	0.01575	0.250	0.51000	0.007661	1.550199
54.0	10.000	0.74000	6.100	1.59000	11.150	0.01520	15.490	2.79000	0.007309	1.557508
55.0	15.500	0.83000	7.200	1.15000	11.186	0.01464	5.080	2.03000	0.007870	1.565377
56.0	15.500	0.47000	2.800	1.27000	11.223	0.01408	9.650	2.54000	0.006578	1.571255
57.0	15.000	1.08000	-7.800	1.28000	11.259	0.01352	0.0	0.0	0.003540	1.575424
58.0	18.900	0.49000	0.0	1.96000	11.297	0.01295	0.0	0.0	0.006679	1.582173
59.0	14.400	1.15000	6.700	4.76000	11.334	0.01237	15.240	6.60000	0.008713	1.590887
60.0	20.000	2.44000	10.000	1.34000	11.371	0.01180	6.100	3.56000	0.010649	1.601536
61.0	19.400	1.73000	13.900	2.10000	11.409	0.01122	3.050	4.32000	0.012240	1.613776
62.0	22.800	2.11000	12.200	1.91000	11.447	0.01063	24.890	19.05000	0.012008	1.625784
63.0	19.400	2.55000	7.200	2.04000	11.486	0.01005	1.270	3.05000	0.009755	1.635539
64.0	13.900	0.72000	3.900	1.73000	11.524	0.00946	0.0	0.0	0.008397	1.643936
65.0	17.200	1.05000	4.400	1.45000	11.563	0.00886	0.0	0.0	0.008581	1.652517
66.0	15.100	2.62000	7.800	0.47000	11.601	0.00827	0.0	0.0	0.010115	1.662633
67.0	20.500	0.55000	0.0	1.73000	11.640	0.00767	0.250	0.25000	0.006803	1.669435
68.0	23.300	0.84000	5.000	2.82000	11.679	0.00707	0.0	0.0	0.007236	1.678671
69.0	20.500	1.07000	4.400	1.77000	11.719	0.00647	0.0	0.0	0.008924	1.687595
70.0	7.400	2.87000	2.800	1.50000	11.758	0.00586	5.080	4.83000	0.008123	1.695718
71.0	5.500	2.08000	0.0	0.72000	11.797	0.00526	9.650	9.65000	0.006915	1.702633
72.0	11.100	1.47000	-2.800	6.11000	11.837	0.00465	0.0	0.0	0.005540	1.708173
73.0	14.300	2.67000	-3.900	1.39000	11.877	0.00404	0.0	0.0	0.004951	1.713124
74.0	12.200	2.95000	-3.900	1.44000	11.916	0.00343	0.0	0.0	0.005012	1.719136
75.0	10.000	3.54000	3.300	1.98000	11.956	0.00282	0.0	0.0	0.008988	1.727124
76.0	6.100	2.79000	1.700	1.30000	11.996	0.00221	35.050	10.41000	0.008438	1.735562
77.0	15.500	1.34000	1.700	0.49000	12.036	0.00160	9.140	3.05000	0.008025	1.743587
78.0	12.800	1.80000	3.900	2.75000	12.076	0.00098	1.780	1.52000	0.009525	1.753112
79.0	7.800	1.30000	1.700	1.60000	12.116	0.00037	0.510	0.51000	0.008734	1.761846
80.0	5.500	0.61000	-1.100	0.99000	12.156	0.00024	2.540	4.57000	0.008710	1.770556
81.0	15.100	0.47000	-2.800	0.92000	12.196	0.00086	2.030	1.27000	0.005455	1.776011
82.0	20.000	1.39000	1.700	2.97000	12.236	0.00147	0.0	0.0	0.007854	1.783865

ORIGINAL PAGE IS
OF POOR QUALITY

44.0	13.800	0.51000	1.300	2.70000	10.871	0.01777	0.0	0.0	0.00330	1.509207
45.0	5.500	1.15000	0.0	0.78000	10.871	0.01948	4.060	3.81000	0.003330	1.509207
46.0	13.800	1.11000	-5.500	1.45000	10.905	0.01097	7.620	7.11000	0.004183	1.511390
47.0	20.500	0.97000	-3.900	1.28000	10.919	0.01844	0.0	0.0	0.005853	1.519243
48.0	21.600	0.61000	-4.400	1.32000	10.973	0.01792	0.0	0.0	0.008291	1.527534
49.0	12.800	5.54000	-4.400	1.27000	11.009	0.01738	0.0	0.0	0.004397	1.531931
50.0	16.100	1.15000	-6.700	1.83000	11.043	0.01584	0.0	0.0	0.004251	1.536182
51.0	18.300	1.18000	-0.600	3.65000	11.078	0.01630	0.0	0.0	0.006356	1.542538
52.0	14.400	2.14000	5.500	1.74000	11.114	0.01575	0.250	0.51000	0.007661	1.549149
53.0	10.000	0.74000	6.100	1.59000	11.150	0.01520	15.490	2.79000	0.007109	1.557508
54.0	10.500	0.63000	7.200	1.15000	11.186	0.01464	5.080	2.03000	0.007870	1.565377
55.0	10.500	0.47000	-2.800	1.27000	11.223	0.01408	9.650	2.54000	0.006578	1.571955
56.0	15.000	1.08000	-7.800	1.28000	11.259	0.01352	0.0	0.0	0.003540	1.575494
57.0	18.900	0.49000	0.0	1.96000	11.297	0.01295	0.0	0.0	0.006679	1.582173
58.0	14.400	1.15000	6.700	4.76000	11.334	0.01237	15.240	6.60000	0.008713	1.590887
59.0	20.000	2.44000	10.000	1.33000	11.371	0.01180	6.100	3.56000	0.010649	1.601536
60.0	19.400	1.73000	13.900	2.10000	11.409	0.01122	3.050	4.32000	0.012240	1.613776
61.0	22.800	2.16000	12.200	1.81000	11.447	0.01063	24.890	19.05000	0.012008	1.625784
62.0	19.400	2.55000	7.200	2.04000	11.486	0.01005	1.270	3.05000	0.009755	1.635539
63.0	13.900	0.72000	3.900	1.73000	11.524	0.00946	0.0	0.0	0.008397	1.643936
64.0	17.200	1.08000	4.400	1.45000	11.563	0.00886	0.0	0.0	0.008581	1.652517
65.0	15.100	2.62000	7.800	0.47000	11.601	0.00827	0.0	0.0	0.010115	1.662633
66.0	20.500	0.55000	0.0	1.73000	11.640	0.00767	0.250	0.25000	0.006803	1.669435
67.0	21.300	0.84000	5.000	2.82000	11.679	0.00707	0.0	0.0	0.007236	1.678671
68.0	20.500	1.07000	4.400	1.77000	11.719	0.00647	0.0	0.0	0.008924	1.687595
69.0	7.400	2.97000	2.800	1.50000	11.758	0.00586	5.080	4.83000	0.008123	1.695718
70.0	5.500	2.04000	0.0	0.72000	11.797	0.00526	9.650	9.65000	0.006915	1.702633
71.0	11.100	1.47000	-2.800	6.11000	11.837	0.00465	0.0	0.0	0.005540	1.708173
72.0	13.300	2.67000	-3.900	1.39000	11.877	0.00404	0.0	0.0	0.004951	1.713124
73.0	12.200	2.75000	-3.900	1.44000	11.916	0.00343	0.0	0.0	0.005012	1.718136
74.0	10.000	3.54000	3.300	1.98000	11.956	0.00282	0.0	0.0	0.008988	1.727124
75.0	6.100	2.79000	1.700	1.30000	11.996	0.00221	35.050	10.41000	0.009438	1.735562
76.0	15.500	1.34000	1.700	0.49000	12.036	0.00160	9.140	3.05000	0.008025	1.743587
77.0	12.800	1.80000	3.900	2.75000	12.076	0.00098	1.780	1.52000	0.009525	1.753112
78.0	7.800	1.30000	1.700	1.60000	12.116	0.00037	0.510	0.51000	0.008734	1.761846
79.0	5.500	0.61000	1.100	0.99000	12.156	0.00024	2.540	4.57000	0.008710	1.770556
80.0	15.100	0.47000	-2.800	0.99000	12.196	0.00086	2.030	1.27000	0.009455	1.775011
81.0	20.000	1.30000	1.700	2.97000	12.236	0.00147	0.0	0.0	0.007854	1.783465
82.0	24.400	1.03000	6.700	3.43000	12.276	0.00208	0.0	0.0	0.010614	1.794479
83.0	22.200	1.45000	6.700	2.25000	12.315	0.00269	0.0	0.0	0.010898	1.805377
84.0	13.300	1.54000	1.100	1.28000	12.355	0.00330	0.250	0.25000	0.008391	1.813768
85.0	17.800	0.93000	1.100	3.79000	12.395	0.00391	0.0	0.0	0.007832	1.821600
86.0	15.000	1.86000	5.500	0.63000	12.435	0.00452	0.0	0.0	0.011256	1.832956
87.0	10.000	0.72000	4.400	0.60000	12.474	0.00513	8.640	2.03000	0.011365	1.844221
88.0	11.900	2.45000	4.400	0.60000	12.514	0.00574	1.020	1.27000	0.010874	1.855095
89.0	17.800	1.21000	3.900	1.45000	12.553	0.00634	0.250	0.76000	0.009957	1.865052
90.0	18.900	2.50000	7.200	2.22000	12.592	0.00694	0.0	0.0	0.012221	1.877273
91.0	16.600	0.63000	-0.600	1.30000	12.631	0.00754	2.030	0.76000	0.007003	1.884276
92.0	21.100	0.78000	-0.600	1.94000	12.670	0.00814	0.0	0.0	0.006106	1.896392
93.0	21.100	2.02000	2.200	1.20000	12.709	0.00874	0.0	0.0	0.008228	1.898610

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 2 TO STAGE 3, JOINT-HEAD

EQUATION IS OF THE FORM

$$RATE = H(1) + H(2) * TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TM * DL + H(7) * TX * TM$$

CONSTANT TERM FOR EQUATION = 0.001931
 COEFFICIENT FOR TMAX TERM = 0.002023
 COEFFICIENT FOR TMIN TERM = -0.005579
 COEFFICIENT FOR DAYLTH TERM = 0.030357
 COEFFICIENT FOR PRECIP TERM = 0.0
 COEFFICIENT TMAX**2 TERM = 0.0
 COEFFICIENT TMIN**2 TERM = 0.0
 COEFFICIENT DAYLTH**2 TERM = 0.0
 COEFFICIENT PRECIP**2 TERM = 0.0
 COEFFICIENT TMAX*DAYLTH = -0.001660
 COEFFICIENT TMIN*DAYLTH = 0.002567
 COEFFICIENT DAYLTH*PRECIP = 0.0
 COEFFICIENT TMAX*TMIN = 0.000089
 COEFFICIENT TMAX*PRECIP = 0.0
 COEFFICIENT TMIN*PRECIP = 0.0

ORIGINAL PAGE IS
 OF POOR
 QUALITY

REGION = KNSS CRCP YEAR = 1964

STAGE RUNS FROM DAY 111 TO DAY 130

LATITUDE = 38.650 STD DEV = 0.267
 LONGITUDE = 98.180 STD DEV = 1.105
 ELEVATION = 456.590 STD DEV = 98.146

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
111.0	25.500	4.05000	14.400	2.76000	13.526	0.01324	6.350	7.87000	0.043803	2.041803
112.0	24.400	1.73000	6.100	1.39000	13.565	0.01362	1.780	2.54000	0.039055	2.082858
113.0	21.900	0.74000	6.100	0.99000	13.604	0.01399	0.0	0.0	0.039321	2.122179
114.0	22.200	1.80000	10.000	0.63000	13.643	0.01436	12.700	16.60000	0.042197	2.164378
115.0	25.000	3.22000	13.300	1.65000	13.681	0.01472	0.0	0.0	0.046394	2.210772
116.0	27.200	1.62000	14.400	1.04000	13.719	0.01509	0.0	0.0	0.042391	2.260164
117.0	24.400	2.76000	12.800	1.86000	13.756	0.01544	4.320	9.65000	0.047406	2.307570
118.0	16.100	2.59000	7.800	1.27000	13.793	0.01579	2.540	3.30000	0.044510	2.352081
119.0	16.600	2.95000	7.800	1.01000	13.830	0.01614	0.250	0.51000	0.045204	2.397289
120.0	20.000	1.85000	1.100	1.04000	13.865	0.01648	0.0	0.0	0.038161	2.445450
121.0	22.200	1.99000	7.200	1.47000	13.901	0.01682	0.250	0.51000	0.043600	2.477049
122.0	22.200	1.33000	7.400	1.07000	13.936	0.01716	0.250	0.51000	0.046977	2.526047
123.0	25.000	3.03000	8.300	0.72000	13.970	0.01748	6.100	8.13000	0.044580	2.570627
124.0	29.200	1.74000	14.400	4.24000	14.004	0.01781	0.0	0.0	0.055653	2.626280
125.0	28.900	1.73000	17.800	5.85000	14.037	0.01812	0.0	0.0	0.052763	2.677043
126.0	29.300	2.50000	18.300	3.62000	14.070	0.01843	0.0	0.0	0.065739	2.744782
127.0	28.300	2.11000	12.200	2.64000	14.102	0.01874	12.950	19.81000	0.052557	2.797339
128.0	29.400	3.29000	13.900	1.81000	14.133	0.01904	0.0	0.0	0.056786	2.854124
129.0	29.300	3.22000	11.700	2.61000	14.164	0.01934	2.790	3.30000	0.052233	2.906357
130.0	25.000	3.00000	5.500	1.86000	14.194	0.01963	0.0	0.0	0.040515	2.946872

REGION = OKL
 STAGE RUNS FROM DAY
 LATITUDE = 34.573
 LONGITUDE = 95.043
 ELEVATION = 251.155

CRCP YEAR = 1969

STAGE RUNS FROM DAY 95 TO DAY 118

STD DEV = 0.404
 STD DEV = 0.411
 STD DEV = 159.715

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
95.0	21.600	1.90000	10.500	2.22000	12.748	0.00917	1.520	1.78000	0.023162	2.023162
96.0	21.100	2.45000	8.900	1.73000	12.786	0.00975	0.0	0.0	0.025872	2.064904
97.0	24.400	1.94000	7.800	0.97000	12.825	0.01033	0.0	0.0	0.032760	2.081774
98.0	27.800	1.55000	13.900	1.86000	12.863	0.01090	0.0	0.0	0.022871	2.104665
99.0	28.300	2.97000	18.300	2.51000	12.900	0.01148	0.0	0.0	0.010756	2.114921

112.0	24.400	1.71000	6.100	1.39000	13.565	0.01162	1.780	2.54000	0.039055	2.082858
113.0	21.900	0.74000	6.100	0.99000	13.604	0.01399	0.0	0.0	0.039321	2.122179
114.0	22.200	1.80000	10.000	0.63000	13.643	0.01436	12.700	16.00000	0.042197	2.164378
115.0	25.000	1.22000	13.300	1.65000	13.681	0.01472	0.0	0.0	0.046394	2.210772
116.0	27.200	1.67000	14.400	1.04000	13.719	0.01509	0.0	0.0	0.049391	2.260164
117.0	24.400	2.76000	12.800	1.86000	13.756	0.01544	4.320	9.65000	0.047406	2.307570
118.0	16.100	2.59000	7.800	1.27000	13.793	0.01579	2.540	3.30000	0.044510	2.352081
119.0	16.600	2.95000	7.800	1.01000	13.830	0.01614	0.250	0.51000	0.045208	2.397289
120.0	20.000	1.86000	1.100	1.04000	13.865	0.01648	0.0	0.0	0.038161	2.435450
121.0	22.200	1.91000	7.200	1.49000	13.901	0.01682	0.250	0.51000	0.043600	2.479049
122.0	22.200	1.33000	7.400	1.07000	13.936	0.01716	0.250	0.51000	0.046997	2.526047
123.0	25.000	3.03000	8.300	0.72000	13.970	0.01748	6.100	8.13000	0.044540	2.570627
124.0	29.900	1.74000	14.400	4.24000	14.004	0.01781	0.0	0.0	0.055653	2.626280
125.0	28.900	1.73000	12.800	5.85000	14.037	0.01812	0.0	0.0	0.052763	2.679043
126.0	29.300	2.50000	18.300	3.62000	14.070	0.01843	0.0	0.0	0.065739	2.744782
127.0	29.300	2.11000	12.200	2.64000	14.102	0.01874	12.950	19.81000	0.052557	2.797339
128.0	29.400	3.20000	11.900	1.81000	14.133	0.01904	0.0	0.0	0.056786	2.854124
129.0	29.300	3.22000	11.700	2.61000	14.164	0.01934	2.750	3.30000	0.052233	2.906357
130.0	25.000	3.00000	5.500	1.86000	14.194	0.01963	0.0	0.0	0.040515	2.946872

REGION = CKL9
 STAGE RUNS FROM DAY 95 TO DAY 118
 LATITUDE = 34.573
 LONGITUDE = 95.043
 ELEVATION = 251.155

CROP YEAR = 1969
 STC DEV = 0.404
 STD DEV = 0.411
 STD DEV = 159.715

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
95.0	21.600	1.90000	10.500	2.22000	12.748	0.00917	1.520	1.78000	0.023162	2.023162
96.0	21.100	2.45000	8.900	1.73000	12.786	0.00975	0.0	0.0	0.025872	2.040034
97.0	24.400	1.94000	7.800	0.93000	12.825	0.01033	0.0	0.0	0.032760	2.091794
98.0	22.800	1.55000	13.900	1.86000	12.853	0.01090	0.0	0.0	0.022871	2.104665
99.0	28.300	2.97000	18.300	2.51000	12.900	0.01148	0.0	0.0	0.030256	2.134321
100.0	27.200	1.60000	11.700	2.40000	12.938	0.01204	5.330	11.68000	0.034141	2.169062
101.0	25.000	1.27000	7.400	2.97000	12.975	0.01261	0.0	0.0	0.033527	2.202590
102.0	23.900	3.39000	11.100	3.20000	13.013	0.01317	0.0	0.0	0.031249	2.233839
103.0	19.400	1.30000	11.100	0.84000	13.050	0.01373	23.880	2.79000	0.026271	2.260110
104.0	22.200	0.97000	11.100	1.07000	13.086	0.01428	0.0	0.0	0.030614	2.290724
105.0	22.800	2.96000	7.400	0.78000	13.122	0.01483	0.0	0.0	0.033254	2.323978
106.0	27.200	2.63000	12.200	1.18000	13.159	0.01537	2.540	4.32000	0.037401	2.361380
107.0	24.400	2.20000	13.300	1.98000	13.194	0.01591	3.560	3.05000	0.034466	2.395845
108.0	20.500	1.57000	10.500	2.24000	13.230	0.01644	0.510	0.51000	0.032498	2.428343
109.0	22.200	1.01000	6.700	1.78000	13.265	0.01697	0.510	0.51000	0.036161	2.464504
110.0	23.900	1.04000	5.500	0.63000	13.300	0.01750	0.0	0.0	0.037466	2.501970
111.0	27.200	2.32000	9.400	1.84000	13.334	0.01802	0.0	0.0	0.039592	2.541562
112.0	29.300	1.20000	12.200	2.30000	13.368	0.01853	0.0	0.0	0.041772	2.583341
113.0	26.100	1.55000	12.200	2.62000	13.402	0.01904	0.0	0.0	0.040567	2.623908
114.0	23.300	2.77000	6.700	1.15000	13.435	0.01955	1.780	2.29000	0.038241	2.662149
115.0	24.400	1.62000	7.800	0.72000	13.468	0.02004	0.0	0.0	0.039115	2.701264
116.0	25.000	1.38000	15.000	2.09000	13.501	0.02053	0.0	0.0	0.043070	2.744333
117.0	23.900	0.63000	10.000	3.81000	13.533	0.02102	34.040	27.43000	0.040706	2.785040
118.0	20.000	2.04000	7.200	1.65000	13.565	0.02150	21.840	23.37000	0.039432	2.824472

REGION = CLO7
 STAGE RUNS FROM DAY 140 TO DAY 155
 LATITUDE = 40.483
 LONGITUDE = 103.213
 ELEVATION = 1259.433

CROP YEAR = 1974
 STC DEV = 0.317
 STD DEV = 0.867
 STD DEV = 147.523

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
140.0	30.500	4.08000	13.900	3.99000	14.619	0.02778	0.760	1.52000	0.063954	2.063954
141.0	23.300	2.05000	2.200	2.87000	14.644	0.02805	0.0	0.0	0.034256	2.099210
142.0	23.300	1.75000	2.200	1.86000	14.668	0.02832	0.0	0.0	0.034192	2.132402
143.0	24.400	1.20000	6.700	2.79000	14.691	0.02858	0.0	0.0	0.047352	2.179754
144.0	26.600	1.60000	7.200	4.05000	14.713	0.02883	0.0	0.0	0.045226	2.224980
145.0	27.200	0.91000	9.400	2.20000	14.735	0.02908	3.560	5.33000	0.052668	2.277648
146.0	27.700	0.72000	9.400	1.73000	14.756	0.02931	2.030	4.57000	0.052004	2.329652
147.0	31.600	3.12000	12.200	3.55000	14.776	0.02954	0.0	0.0	0.057501	2.387154
148.0	34.400	1.44000	12.200	1.42000	14.796	0.02976	0.0	0.0	0.053374	2.440528
149.0	32.700	3.27000	12.200	1.73000	14.814	0.02996	0.0	0.0	0.056126	2.498654
150.0	27.700	3.30000	11.700	1.20000	14.832	0.03016	0.0	0.0	0.062178	2.558832
151.0	24.400	2.91000	6.700	1.45000	14.849	0.03035	0.0	0.0	0.048467	2.607299
152.0	22.800	1.60000	6.700	1.30000	14.865	0.03054	0.0	0.0	0.052006	2.659306
153.0	28.300	3.87000	7.200	2.62000	14.881	0.03071	0.0	0.0	0.042403	2.701708
154.0	32.200	1.11000	11.100	3.69000	14.895	0.03087	0.0	0.0	0.052403	2.754112

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 3 TO STAGE 4, HEAD-SOFT DOUGH

EQUATION IS OF THE FORM

$$\text{RATE} = H(1) + H(2) * TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TM * DL + H(7) * TX * TM$$

CONSTANT TERM FOR EQUATION = -0.235170
 COEFFICIENT FOR TMAX TERM = -0.008849
 COEFFICIENT FOR TMIN TERM = 0.007073
 COEFFICIENT FOR DAYLTH TERM = -0.086117
 COEFFICIENT FOR PRECIP TERM = 0.0
 COEFFICIENT TMAX**2 TERM = 0.0
 COEFFICIENT TMIN**2 TERM = 0.0
 COEFFICIENT DAYLTH**2 TERM = 0.0
 COEFFICIENT PRECIP**2 TERM = 0.0
 COEFFICIENT TMAX*DAYLTH = 0.003912
 COEFFICIENT TMIN*DAYLTH = -0.002844
 COEFFICIENT DAYLTH*PRECIP = 0.0
 COEFFICIENT TMAX*TMIN = -0.000004
 COEFFICIENT TMAX*PRECIP = 0.0
 COEFFICIENT TMIN*PRECIP = 0.0

ORIGINAL PAGE IS
 OF POOR QUALITY

REGION = KNS5 CROP YEAR = 1964

STAGE RUNS FROM DAY 130 TO DAY 153

LATITUDE = 38.650 STD DEV = 0.267
 LONGITUDE = 98.180 STD DEV = 1.105
 ELEVATION = 456.590 STD DEV = 98.146

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
130.0	25.000	3.00000	5.500	1.86000	14.194	0.01963	0.0	0.0	0.043584	3.043584
131.0	27.200	1.20000	7.200	1.24000	14.224	0.01991	0.0	0.0	0.044171	3.087756
132.0	24.400	1.95000	11.700	0.99000	14.253	0.02019	1.780	2.29000	0.046889	3.134644
133.0	22.200	1.92000	6.700	1.88000	14.282	0.02046	3.300	2.54000	0.043679	3.178324
134.0	23.300	2.46000	1.100	0.74000	14.309	0.02073	0.0	0.0	0.041050	3.219374
135.0	27.200	2.85000	7.800	4.53000	14.337	0.02099	0.0	0.0	0.044339	3.261713
136.0	30.500	2.03000	13.300	1.08000	14.363	0.02124	0.0	0.0	0.046739	3.310451
137.0	32.200	1.28000	14.400	1.62000	14.389	0.02149	0.0	0.0	0.047532	3.357984
138.0	32.700	1.54000	16.100	1.24000	14.414	0.02173	0.0	0.0	0.047897	3.405890
139.0	32.700	1.54000	16.100	1.54000	14.439	0.02196	0.0	0.0	0.047798	3.451678
140.0	32.700	0.82000	14.400	1.33000	14.463	0.02219	0.0	0.0	0.047813	3.501491
141.0	32.700	0.79000	15.000	1.94000	14.486	0.02241	0.0	0.0	0.047754	3.547245
142.0	32.700	1.04000	16.600	1.28000	14.508	0.02263	0.0	0.0	0.047423	3.596668
143.0	33.300	1.33000	18.200	1.64000	14.530	0.02283	1.270	1.78000	0.047454	3.644122
144.0	35.000	2.08000	18.900	0.25000	14.551	0.02303	0.0	0.0	0.048888	3.693010
145.0	32.700	3.50000	17.200	1.81000	14.571	0.02323	0.760	1.78000	0.046856	3.732866
146.0	34.400	3.86000	15.900	1.94000	14.591	0.02342	0.0	0.0	0.049746	3.789613
147.0	37.200	1.27000	21.600	2.17000	14.610	0.02360	0.510	1.27000	0.050183	3.839795
148.0	27.200	6.70000	11.100	0.84000	14.628	0.02377	16.510	18.29000	0.042091	3.881886
149.0	21.100	3.79000	9.400	0.91000	14.646	0.02394	24.890	8.89000	0.033933	3.915819
150.0	20.500	1.24000	11.100	0.72000	14.662	0.02410	0.0	0.0	0.031519	3.947338
151.0	16.100	2.05000	11.100	0.68000	14.678	0.02425	6.350	8.13000	0.023956	3.971294
152.0	20.000	3.59000	8.900	1.64000	14.693	0.02440	8.890	8.13000	0.031003	4.002297
153.0	22.200	2.05000	4.400	0.68000	14.708	0.02453	0.0	0.0	0.037519	4.032816

REGION = OKL7 CROP YEAR = 1969

STAGE RUNS FROM DAY 119 TO DAY 140

LATITUDE = 34.573 STD DEV = 0.404
 LONGITUDE = 95.043 STD DEV = 0.411
 ELEVATION = 251.155 STD DEV = 159.715

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
119.0	22.800	1.14000	4.400	1.45000	13.526	0.02197	0.0	0.0	0.049055	3.049055

132.0	25.000	1.00000	5.500	1.86000	14.194	0.01183	0.0	0.0	0.04171	3.081756
131.0	27.200	1.20000	7.200	1.24000	14.224	0.01991	0.0	0.0	0.046889	3.134644
132.0	24.400	1.00000	11.700	0.79000	14.253	0.02019	1.780	2.29000	0.043679	3.178324
133.0	22.200	1.22000	6.700	1.88000	14.282	0.02046	3.300	2.54000	0.041050	3.219374
134.0	23.100	2.44000	1.100	0.74000	14.309	0.02073	0.0	0.0	0.044339	3.263713
135.0	27.200	2.85000	7.400	4.53000	14.337	0.02099	0.0	0.0	0.046737	3.310451
136.0	30.500	2.01000	13.300	1.03000	14.363	0.02124	0.0	0.0	0.047877	3.405880
137.0	32.200	1.28000	14.400	1.62000	14.389	0.02149	0.0	0.0	0.047779	3.453678
138.0	32.700	1.54000	16.100	1.24000	14.414	0.02173	0.0	0.0	0.047813	3.501491
139.0	32.700	1.54000	16.100	1.54000	14.439	0.02196	0.0	0.0	0.047754	3.549245
140.0	32.700	0.82000	14.400	1.33000	14.463	0.02219	0.0	0.0	0.047423	3.596608
141.0	32.700	0.91000	15.000	1.94000	14.486	0.02241	0.0	0.0	0.047454	3.644122
142.0	32.700	1.04000	16.600	1.28000	14.508	0.02263	0.0	0.0	0.048888	3.693010
143.0	33.300	1.31000	18.300	1.64000	14.530	0.02283	1.270	1.78000	0.048856	3.739866
144.0	35.000	2.03000	18.700	0.25000	14.551	0.02303	0.0	0.0	0.049746	3.789613
145.0	32.700	3.50000	17.200	1.81000	14.571	0.02323	0.760	1.78000	0.050183	3.839795
146.0	34.400	3.86000	15.000	1.34000	14.591	0.02342	0.0	0.0	0.042091	3.881886
147.0	37.200	1.27000	21.600	2.17000	14.610	0.02360	0.510	1.27000	0.033933	3.915819
148.0	27.200	6.78000	11.100	0.84000	14.628	0.02377	16.510	16.29000	0.031519	3.947338
149.0	21.100	3.77000	7.400	0.71000	14.646	0.02394	24.890	8.89000	0.032956	3.971294
150.0	20.500	1.27000	11.100	0.72000	14.662	0.02410	0.0	0.0	0.031003	4.002217
151.0	16.100	2.05000	11.100	0.68000	14.678	0.02425	6.350	8.13000	0.037519	4.039816
152.0	20.600	3.59000	8.900	1.64000	14.693	0.02440	8.890	8.13000		
153.0	22.200	2.05000	4.400	0.68000	14.708	0.02453	0.0	0.0		

REGION = OKL7 CROP YEAR = 1969
 STAGE RUNS FROM DAY 119 TO DAY 140
 LATITUDE = 34.573 STD DEV = 0.404
 LONGITUDE = 95.043 STD DEV = 0.411
 ELEVATION = 251.155 STD DEV = 159.715

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
117.0	22.800	1.14000	4.400	1.45000	13.526	0.02197	0.0	0.0	0.049055	3.049055
118.0	24.400	1.31000	7.800	0.60000	13.627	0.02244	0.0	0.0	0.052736	3.101790
119.0	26.100	1.83000	10.500	1.33000	13.657	0.02290	0.0	0.0	0.054351	3.156141
120.0	28.300	1.04000	10.500	0.84000	13.697	0.02335	0.0	0.0	0.048894	3.205036
121.0	27.200	1.27000	11.700	2.71000	13.717	0.02380	0.0	0.0	0.053626	3.258661
122.0	25.100	0.25000	15.000	2.20000	13.746	0.02424	1.520	3.56000	0.052122	3.320783
123.0	25.000	1.31000	15.500	0.25000	13.775	0.02467	15.240	14.48000	0.054435	3.385268
124.0	27.200	2.83000	11.300	1.54000	13.803	0.02509	10.920	10.92000	0.055445	3.440713
125.0	27.700	1.28000	15.000	1.50000	13.830	0.02551	40.130	26.92000	0.057071	3.497784
126.0	22.800	1.26000	15.000	1.01000	13.858	0.02592	19.050	25.65000	0.064569	3.562353
127.0	24.400	0.82000	7.200	2.60000	13.884	0.02632	0.0	0.0	0.048457	3.610812
128.0	25.500	1.22000	9.400	3.15000	13.910	0.02672	0.0	0.0	0.050001	3.660813
129.0	25.500	0.47000	6.100	2.83000	13.936	0.02710	0.0	0.0	0.044838	3.705651
130.0	26.100	2.06000	13.300	2.95000	13.961	0.02748	2.030	4.83000	0.054025	3.759675
131.0	26.600	0.89000	12.800	0.84000	13.985	0.02785	2.540	2.54000	0.052262	3.811937
132.0	28.300	0.72000	15.000	1.11000	14.009	0.02821	0.0	0.0	0.052784	3.864721
133.0	26.600	0.91000	15.500	0.99000	14.033	0.02857	5.840	8.89000	0.054579	3.912300
134.0	26.600	2.46000	15.100	1.01000	14.056	0.02891	11.680	21.34000	0.054652	3.973952
135.0	24.400	1.88000	16.600	1.38000	14.078	0.02925	10.410	14.99000	0.056290	4.030242
136.0	21.600	1.33000	13.900	0.84000	14.100	0.02957	25.650	24.13000	0.054699	4.084941
137.0	27.200	1.50000	12.800	1.34000	14.121	0.02989	8.380	19.05000	0.049398	4.134339
138.0	28.900	1.60000	15.000	0.47000	14.141	0.03020	0.0	0.0	0.050077	4.184416

REGION = CLC7 CROP YEAR = 1974
 STAGE RUNS FROM DAY 155 TO DAY 177
 LATITUDE = 40.483 STD DEV = 0.317
 LONGITUDE = 103.213 STD DEV = 0.867
 ELEVATION = 1259.433 STD DEV = 147.523

DAY	TMAX	STD DEV	TMIN	STD DEV	CAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
155.0	32.700	1.24000	12.200	0.99000	14.909	0.03103	0.0	0.0	0.051124	3.051124
156.0	28.700	3.92000	12.200	2.28000	14.922	0.03117	0.250	0.51000	0.041522	3.092716
157.0	23.300	2.83000	8.900	1.60000	14.934	0.03131	0.0	0.0	0.031564	3.124280
158.0	21.100	2.04000	6.100	3.24000	14.946	0.03144	0.250	0.76000	0.029428	3.153708
159.0	20.500	3.61000	8.900	1.64000	14.956	0.03155	28.700	27.43000	0.023621	3.177328
160.0	16.100	4.22000	7.200	1.01000	14.966	0.03166	36.070	26.16000	0.013794	3.191122
161.0	22.800	2.85000	6.100	1.04000	14.975	0.03176	0.250	0.76000	0.033517	3.224639
162.0	24.400	1.64000	9.400	1.54000	14.983	0.03185	0.0	0.0	0.032890	3.257529
163.0	27.700	3.77000	10.000	1.78000	14.990	0.03193	0.0	0.0	0.041107	3.298536
164.0	30.500	0.55000	12.800	0.72000	14.996	0.03200	0.0	0.0	0.044589	3.343224
165.0	31.600	1.01000	12.800	1.86000	15.002	0.03206	1.520	1.52000	0.047696	3.390920
166.0	31.100	2.20000	13.900	2.10000	15.004	0.03211	0.0	0.0	0.044507	3.436427

ORIGINAL PAGE IS
 OF POOR QUALITY

167.0	34.900	1.98000	12.800	2.60000	15.015	0.03221	0.0	0.0	0.054364	3.573529
170.0	36.600	1.14000	13.300	2.47000	15.016	0.03223	0.0	0.0	0.061373	3.634902
171.0	38.300	1.66000	13.900	3.00000	15.017	0.03223	0.250	0.51000	0.065307	3.700209
172.0	37.200	3.27000	15.500	2.10000	15.016	0.03222	0.0	0.0	0.057462	3.759671
173.0	32.200	3.57000	11.700	1.33000	15.015	0.03221	0.0	0.0	0.051241	3.810913
174.0	27.700	1.37000	13.300	1.38000	15.013	0.03218	0.0	0.0	0.035658	3.846571
175.0	28.900	0.78000	12.800	0.93000	15.009	0.03215	2.030	3.81000	0.039951	3.886522
176.0	31.100	2.17000	14.400	1.96000	15.006	0.03211	0.0	0.0	0.043708	3.930230
177.0	33.900	1.50000	15.000	1.50000	15.001	0.03205	0.0	0.0	0.050701	3.980931

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 4 TO STAGE 5, SOFT DOUGH-RIPE

EQUATION IS OF THE FORM

$$\text{RATE} = H(1) + H(2) * TX + H(3) * TM + H(4) * DL + H(5) * TX * DL + H(6) * TM * DL + H(7) * TX * TM$$

TEST OF CROP CALENDAR EQUATION FOR WINTER WHEAT, STAGE 4 TO STAGE 5 - SOFT DOUGH-RIPE

EQUATION IS OF THE FORM

$$\text{RATE} = H(1) + H(2) \cdot TX + H(3) \cdot TM + H(4) \cdot DL + H(5) \cdot TX \cdot DL + H(6) \cdot TM \cdot DL + H(7) \cdot TX \cdot TM$$

CONSTANT TERM FOR EQUATION = -2.665850
 COEFFICIENT FOR TMAX TERM = -0.074211
 COEFFICIENT FOR TMIN TERM = -0.046377
 COEFFICIENT FOR DAYLTH TERM = -0.867280
 COEFFICIENT FOR PRECIP TERM = 0.0
 COEFFICIENT TMAX**2 TERM = 0.0
 COEFFICIENT TMIN**2 TERM = 0.0
 COEFFICIENT DAYLTH**2 TERM = 0.0
 COEFFICIENT PRECIP**2 TERM = 0.0
 COEFFICIENT TMAX*DAYLTH = 0.024111
 COEFFICIENT TMIN*DAYLTH = 0.009960
 COEFFICIENT DAYLTH*PRECIP = 0.0
 COEFFICIENT TMAX*TMIN = 0.000689
 COEFFICIENT TMAX*PRECIP = 0.0
 COEFFICIENT TMIN*PRECIP = 0.0

ORIGINAL PAGE IS
OF POOR QUALITY

151

REGION = KNS5 CRCP YEAR = 1964
 STAGE RUNS FROM DAY 153 TO DAY 166
 LATITUDE = 38.650 STD DEV = 0.267
 LONGITUDE = 98.183 STD DEV = 1.105
 ELEVATION = 456.590 STD DEV = 98.146

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
153.0	21.600	1.44000	8.300	1.90000	14.708	0.02453	1.780	2.03000	0.087030	4.087030
154.0	25.000	1.45000	9.400	1.78000	14.722	0.02466	0.0	0.0	0.071381	4.158411
155.0	25.000	1.64000	13.900	1.33000	14.735	0.02479	8.640	5.84000	0.060503	4.218214
156.0	21.100	2.14000	11.700	1.20000	14.747	0.02490	4.570	6.60000	0.062667	4.281581
157.0	27.700	3.07000	11.700	1.73000	14.758	0.02501	1.270	2.79000	0.062190	4.343771
158.0	31.600	1.73000	17.800	0.99000	14.769	0.02511	0.510	0.76000	0.081702	4.425472
159.0	35.000	2.01000	21.600	0.63000	14.779	0.02521	0.0	0.0	0.120052	4.545524
160.0	33.900	4.22000	15.000	0.0	14.788	0.02529	52.580	0.0	0.081906	4.627431
161.0	31.600	1.07000	13.300	0.63000	14.796	0.02537	0.0	0.0	0.069124	4.696555
162.0	30.000	1.60000	16.600	1.57000	14.803	0.02544	13.290	9.40000	0.072532	4.767087
163.0	31.100	0.93000	15.500	0.84000	14.810	0.02551	22.610	8.64000	0.074816	4.843203
164.0	30.500	1.34000	16.600	1.86000	14.816	0.02557	11.430	11.43000	0.075359	4.919261
165.0	30.000	1.45000	18.300	1.07000	14.821	0.02561	1.780	1.78000	0.076954	4.996215
166.0	29.400	0.93000	15.000	1.15000	14.825	0.02566	10.160	8.13000	0.066585	5.062800

REGION = KNS1 CRCP YEAR = 1969

LATITUDE = 39.584
 LONGITUDE = 100.816
 ELEVATION = 878.433

SIC DEV = 0.242
 STD DEV = 1.079
 STO DEV = 220.066

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
164.0	20.000	1.83000	6.700	0.0	14.907	0.02379	56.390	0.0	0.037938	4.037938
165.0	16.100	3.54000	5.500	1.32000	14.912	0.02384	2.540	3.05000	0.041422	4.079361
166.0	16.100	3.05000	7.200	1.94000	14.916	0.02388	0.0	0.0	0.028910	4.108271
167.0	15.500	1.01000	12.200	0.96000	14.920	0.02391	6.350	4.57000	0.001320	4.106951
168.0	20.500	3.36000	12.800	0.28000	14.923	0.02393	10.160	10.92000	0.013722	4.120944
169.0	26.100	3.22000	11.700	1.94000	14.925	0.02395	0.0	0.0	0.041389	4.162332
170.0	31.100	2.74000	11.700	1.83000	14.926	0.02396	0.0	0.0	0.063213	4.225545
171.0	25.500	4.72000	11.100	0.72000	14.926	0.02396	0.0	0.0	0.038164	4.263209
172.0	26.600	4.01000	12.800	1.63000	14.926	0.02396	10.920	11.94000	0.044644	4.305553
173.0	26.600	2.28000	13.300	0.83000	14.925	0.02395	9.400	8.13000	0.045305	4.353858
174.0	25.500	1.63000	16.600	0.70000	14.922	0.02393	1.020	1.27000	0.040507	4.394365
175.0	26.600	1.73000	15.000	1.66000	14.919	0.02391	4.060	7.11000	0.047508	4.441873
176.0	27.200	2.28000	14.400	1.32000	14.916	0.02387	0.760	1.27000	0.050811	4.492685
177.0	26.600	1.63000	12.800	1.39000	14.911	0.02383	1.020	1.27000	0.046091	4.538775
178.0	24.900	2.84000	8.300	1.37000	14.906	0.02379	0.0	0.0	0.046259	4.585034
179.0	36.600	4.50000	15.500	3.80000	14.900	0.02373	0.0	0.0	0.113173	4.698207
180.0	34.400	3.51000	17.800	2.66000	14.892	0.02367	0.0	0.0	0.112408	4.810615
181.0	28.900	1.63000	16.600	1.36000	14.885	0.02361	0.0	0.0	0.066822	4.877438
182.0	30.000	1.44000	12.800	2.31000	14.876	0.02353	0.0	0.0	0.062969	4.940407
183.0	31.900	3.76000	17.200	2.54000	14.876	0.02353	0.0	0.0	0.101045	5.043451
184.0	32.400	3.67000	13.400	0.70000	14.856	0.02336	0.0	0.0	0.156645	5.200086
185.0	35.000	5.62000	14.300	0.83000	14.845	0.02327	0.510	1.02000	0.112823	5.312969
186.0	29.400	1.37000	16.100	2.09000	14.833	0.02316	7.110	13.21000	0.068809	5.381718

REGION = KNS9

CRCP YEAR = 1974

STAGE RUNS FROM DAY

149 TO DAY

164

LATITUDE = 37.537

SIC DEV = 0.296

LONGITUDE = 95.837

STD DEV = 1.065

ELEVATION = 344.729

STO DEV = 78.029

DAY	TMAX	STD DEV	TMIN	STD DEV	DAYLTH	STD DEV	PRECIP	STD DEV	RATE	STAGE
149.0	31.100	2.59000	21.600	0.61000	14.547	0.02574	0.0	0.0	0.067607	4.067607
150.0	31.100	1.07000	21.600	0.93000	14.563	0.02591	0.510	1.02000	0.069175	4.136731
151.0	29.400	1.54000	14.400	1.47000	14.579	0.02608	14.480	18.03000	0.069078	4.205860
152.0	29.000	1.64000	12.800	0.63000	14.593	0.02623	0.0	0.0	0.081971	4.287811
153.0	27.700	0.72000	12.800	0.47000	14.607	0.02638	0.0	0.0	0.073225	4.361056
154.0	27.200	0.82000	16.600	1.34000	14.620	0.02652	0.0	0.0	0.067522	4.428558
155.0	24.400	1.54000	16.600	1.64000	14.633	0.02666	12.450	22.35000	0.064975	4.493513
156.0	27.200	2.01000	15.000	0.82000	14.644	0.02678	21.340	6.35000	0.068485	4.562017
157.0	26.600	2.06000	15.500	0.39000	14.655	0.02690	13.020	10.41000	0.066914	4.628931
158.0	25.000	0.72000	15.500	0.72000	14.666	0.02701	14.730	13.97000	0.065013	4.693944
159.0	26.600	1.64000	17.200	0.79000	14.675	0.02711	0.760	1.02000	0.063099	4.757043
160.0	25.500	1.01000	11.900	2.39000	14.684	0.02720	14.730	10.92000	0.066740	4.823984
161.0	27.200	0.91000	11.100	1.01000	14.692	0.02729	0.0	0.0	0.068922	4.872006
162.0	26.600	1.59000	15.500	0.25000	14.699	0.02736	4.830	3.30000	0.063903	4.954609
163.0	25.500	0.47000	10.500	0.61000	14.705	0.02743	1.520	3.05000	0.070849	5.027458
164.0	30.000	1.86000	15.500	0.49000	14.711	0.02749	1.270	2.54000	0.069147	5.096605